



2017  
**ANNUAL REPORT**

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FINANCIAL STABILITY OVERSIGHT COUNCIL

# Financial Stability Oversight Council

The Financial Stability Oversight Council (Council) was established by the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) and is charged with three primary purposes:

1. To identify risks to the financial stability of the United States that could arise from the material financial distress or failure, or ongoing activities, of large, interconnected bank holding companies or nonbank financial companies, or that could arise outside the financial services marketplace.
2. To promote market discipline, by eliminating expectations on the part of shareholders, creditors, and counterparties of such companies that the U.S. government will shield them from losses in the event of failure.
3. To respond to emerging threats to the stability of the U.S. financial system.

Pursuant to the Dodd-Frank Act, the Council consists of ten voting members and five nonvoting members and brings together the expertise of federal financial regulators, state regulators, and an insurance expert appointed by the President.

The voting members are:

- the Secretary of the Treasury, who serves as the Chairperson of the Council;
- the Chairman of the Board of Governors of the Federal Reserve System;
- the Comptroller of the Currency;
- the Director of the Bureau of Consumer Financial Protection;
- the Chairman of the Securities and Exchange Commission;
- the Chairperson of the Federal Deposit Insurance Corporation;
- the Chairperson of the Commodity Futures Trading Commission;
- the Director of the Federal Housing Finance Agency;
- the Chairman of the National Credit Union Administration; and
- an independent member having insurance expertise who is appointed by the President and confirmed by the Senate for a six-year term.

The nonvoting members, who serve in an advisory capacity, are:

- the Director of the Office of Financial Research;
- the Director of the Federal Insurance Office;
- a state insurance commissioner designated by the state insurance commissioners;
- a state banking supervisor designated by the state banking supervisors; and
- a state securities commissioner (or officer performing like functions) designated by the state securities commissioners.

The state insurance commissioner, state banking supervisor, and state securities commissioner serve two-year terms.

## Statutory Requirements for the Annual Report

Section 112(a)(2)(N) of the Dodd-Frank Act requires that the annual report address the following:

- i. the activities of the Council;
- ii. significant financial market and regulatory developments, including insurance and accounting regulations and standards, along with an assessment of those developments on the stability of the financial system;
- iii. potential emerging threats to the financial stability of the United States;
- iv. all determinations made under Section 113 or Title VIII, and the basis for such determinations;
- v. all recommendations made under Section 119 and the result of such recommendations; and
- vi. recommendations—
  - I. to enhance the integrity, efficiency, competitiveness, and stability of United States financial markets;
  - II. to promote market discipline; and
  - III. to maintain investor confidence.

## Approval of the Annual Report

This annual report was approved unanimously by the voting members of the Council on December 14, 2017. Except as otherwise indicated, data cited in this report are as of October 31, 2017.

## Abbreviations for Council Member Agencies and Member Agency Offices

- Department of the Treasury (Treasury)
- Board of Governors of the Federal Reserve System (Federal Reserve)
- Office of the Comptroller of the Currency (OCC)
- Bureau of Consumer Financial Protection (CFPB)
- Securities and Exchange Commission (SEC)
- Federal Deposit Insurance Corporation (FDIC)
- Commodity Futures Trading Commission (CFTC)
- Federal Housing Finance Agency (FHFA)
- National Credit Union Administration (NCUA)
- Office of Financial Research (OFR)
- Federal Insurance Office (FIO)

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# 1

## Member Statement

**The Honorable Paul D. Ryan**  
Speaker of the House  
United States House of Representatives


**The Honorable Nancy Pelosi**  
Democratic Leader  
United States House of Representatives

**The Honorable Michael R. Pence**  
President of the Senate  
United States Senate

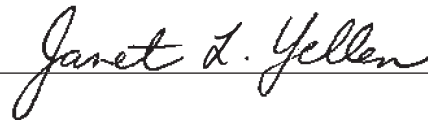
**The Honorable Mitch McConnell**  
Majority Leader  
United States Senate

**The Honorable Charles E. Schumer**  
Democratic Leader  
United States Senate

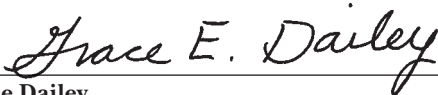
In accordance with Section 112(b)(2) of the Dodd-Frank Wall Street Reform and Consumer Protection Act, for the reasons outlined in the annual report, I believe that additional actions, as described below, should be taken to ensure financial stability and to mitigate systemic risk that would negatively affect the economy: the issues and recommendations set forth in the Council's annual report should be fully addressed; the Council should continue to build its systems and processes for monitoring and responding to emerging threats to the stability of the United States financial system, including those described in the Council's annual report; the Council and its member agencies should continue to implement the laws they administer, including those established by, and amended by, the Dodd-Frank Act, through efficient and effective measures; and the Council and its member agencies should exercise their respective authorities for oversight of financial firms and markets so that the private sector employs sound financial risk management practices to mitigate potential risks to the financial stability of the United States.



**Steven T. Mnuchin**  
Secretary of the Treasury  
Chairperson, Financial Stability Oversight Council



**Janet L. Yellen**  
Chair  
Board of Governors of the Federal Reserve System



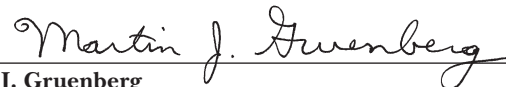
**Grace Dailey**  
Senior Deputy Comptroller and Chief National Bank Examiner  
Office of the Comptroller of the Currency



**J. Michael Mulvaney**  
Acting Director  
Bureau of Consumer Financial Protection



**Jay Clayton**  
Chairman  
Securities and Exchange Commission



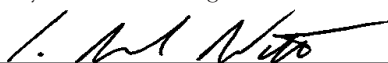
**Martin J. Gruenberg**  
Chairman  
Federal Deposit Insurance Corporation



**J. Christopher Giancarlo**  
Chairman  
Commodity Futures Trading Commission



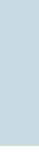
**Melvin L. Watt**  
Director  
Federal Housing Finance Agency



**J. Mark McWatters**  
Chairman  
National Credit Union Administration



**S. Roy Woodall, Jr.**  
Independent Member Having Insurance Expertise  
Financial Stability Oversight Council



U.S. financial market conditions have generally been stable since the publication of the Council's last annual report. Asset prices generally increased, commodity prices partially recovered after falling in previous years, and commercial real estate (CRE) valuations remained high, according to certain measures. Short-term funding markets experienced significant changes over the past two years as SEC reforms of money market mutual funds (MMFs) went into effect. While low interest rates have supported growth in recent years, interest rates have generally increased across maturities since the Council's last annual report, against the backdrop of continued gradual improvement in economic fundamentals. Developed economies grew at relatively subdued levels, and emerging market economic growth picked up slightly, as the global economy has continued to rebound slowly in the post-crisis period. At the same time, several factors continue to generate global economic uncertainty, including developments following the referendum in the United Kingdom (UK) to leave the European Union (EU), problems affecting European banks, and rapid corporate credit growth in China.

Since the Council's last annual report, actions by financial regulatory agencies have included the continued implementation of capital and liquidity standards for financial institutions; application of supervisory and company-run stress tests; supervisory review and feedback on large banking organizations' resolution plans; implementation of additional reforms of the derivatives markets and of asset management practices; enhanced safeguards related to operational risks for technological systems and cybersecurity; and improvements in data scope, quality, and accessibility.

Over the past 18 months, the Council rescinded its designations of two nonbank financial companies for supervision by the Federal Reserve. In June 2016, the Council rescinded its determination regarding GE Capital Global Holdings, LLC (GE Capital), based on its determination that changes at GE Capital since the Council's July 2013 determination significantly reduced the potential for GE Capital's material financial distress to threaten U.S. financial stability. The Council rescinded its determination regarding AIG in September 2017, based on decreased capital markets exposures to the company; the company's exit from certain important financial markets; and additional Council analyses indicating that there is not a significant risk that a forced asset liquidation by AIG would disrupt market functioning and thereby pose a threat to U.S. financial stability.

The Council continues to serve as a forum to facilitate coordination among federal and state financial regulatory agencies to monitor market developments and identify potential threats to financial stability. As a result of post-crisis regulatory reforms, the U.S. financial system is clearly stronger and much better positioned to withstand a market shock or an economic downturn than it was before the financial crisis. Maintaining a resilient financial system is important in large part because economic growth—and the economic well-being of Americans—depends on the financial system's ability to provide capital to businesses and individuals, to provide vehicles for savings, and to intermediate financial transactions even in the face of adverse events. Indeed, the crisis had a significant and lasting effect on U.S. economic growth. Nearly ten years after the crisis began, with most of the post-crisis regulatory reforms required by the Dodd-Frank Act having been implemented, this is an appropriate time to assess the effectiveness of the reforms and to consider any unintended consequences that could have negative effects on financial stability or economic growth.



The U.S. financial regulatory system should promote economic growth not just by preventing financial crises that reduce growth, but also by minimizing those regulations that increase costs without commensurate benefits. Regulators have taken actions to consider these issues, including the report issued in March 2017 by the FDIC, Federal Reserve, OCC, and NCUA, pursuant to the Economic Growth and Regulatory Paperwork Reduction Act (EGRPRA); the CFTC's ongoing internal review of agency rules, regulations and practices to identify those areas that can be simplified to make them less burdensome and less costly; the SEC's and CFPB's retrospective review of certain rules; and review by relevant agencies of the Volcker Rule for potential ways to simplify its requirements and address unintended consequences.

Council member agencies should, where possible and without reducing the resilience of the financial system, continue to address regulatory overlap and duplication, modernize outdated regulations, and, where authority exists, tailor regulations based on the size and complexity of financial institutions.

Separately, the Council notes the potential for persistent budget deficits to negatively impact economic growth. Government budgets were strained by the cyclical response of revenues and expenditures after the financial crisis as well as the fiscal actions taken to ease the recession and aid the recovery. The federal government deficit stood at 3.2 percent of GDP in 2016, and net publicly held federal debt outstanding was over \$14 trillion. Achieving long run sustainability of the national budget is important to maintain global market confidence in U.S. Treasury securities and the financial stability of the United States.

### **Cybersecurity**

As the financial system relies more heavily on technology, the risk that significant cybersecurity incidents targeting this technology can prevent the financial sector from delivering services and impact U.S. financial stability increases. Through collaboration and partnership, substantial gains have been made by both government and industry in response to cybersecurity risks, in part by refining their shared understanding of potential vulnerabilities within the financial sector. It is important that this work continue and include greater emphasis on understanding and mitigating the risk that significant cybersecurity incidents have business and systemic implications.

### **Asset Management Products and Activities**

In April 2016, the Council issued an update on its review of potential risks to financial stability that might arise from asset management products and activities. In that update, the Council focused primarily on potential threats and vulnerabilities in the areas of liquidity and redemption risk and the use of leverage. The SEC adopted a rule relating to funds' liquidity risk management practices and proposed a rule regarding funds' use of derivatives. The SEC should assess the final rule and the rule proposal to evaluate whether the chosen regulatory approach addresses potential risks effectively and efficiently.

In November 2016, the Council's interagency hedge fund working group provided an update on its findings and noted that additional data and improved data sharing among relevant regulators would be necessary to better assess potential risks to financial stability posed by hedge funds. Regulators should review their data collections and assess whether they are sufficient for the Council to monitor whether and how hedge funds may pose risks to financial stability.

### **Capital, Liquidity, and Resolution**

In the years since the financial crisis, large financial institutions have made much progress in improving their resiliency by decreasing their leverage and improving their ability to respond to draws on their liquidity. Large bank holding companies (BHCs) engaged in the resolution planning process have also made important changes to their structure and operations in order to improve resolvability. The financial regulatory agencies have developed and implemented rules intended to further increase the robustness

of these institutions and enhance financial stability. Regulators should ensure that these institutions have sufficient capital and liquidity to reduce their vulnerability to economic and financial shocks. Regulators should also continue to monitor and assess the impact of rules on financial institutions and markets, including on market liquidity.

### **Central Counterparties**

Central counterparties (CCPs) have the potential to provide considerable benefits to financial stability by enhancing market functioning, reducing counterparty risk, and increasing transparency. These benefits require that CCPs be highly robust and resilient. Regulators should continue to coordinate in the supervision of all CCPs that are designated as systemically important financial market utilities (FMUs). Member agencies should continue to evaluate whether existing rules and standards for CCPs and their clearing members are sufficiently robust to mitigate potential threats to financial stability. Agencies should also continue working with international standard-setting bodies to identify and address areas of common concern as additional derivatives clearing requirements are implemented in other jurisdictions. Evaluation of the performance of CCPs under stress scenarios can be a very useful tool for assessing the robustness and resilience of such institutions and identifying potential operational areas for improvement. Supervisory agencies should continue to conduct these exercises. Regulators should also continue to monitor and assess interconnections among CCPs, their clearing members, and other financial institutions; consider additional improvements in public disclosure; and develop resolution plans for systemically important CCPs.

### **Short-Term Wholesale Funding**

While some progress has been made in the reduction of counterparty risk exposures in repurchase agreement (repo) markets in recent years, the potential for fire sales of collateral by creditors of a defaulted broker-dealer remains a vulnerability. The SEC should monitor and assess the effectiveness of the MMF rules implemented last year. Regulators should also monitor the potential migration of activity to other cash management vehicles and the impact of money market developments on other financial markets and institutions.

### **Reliance on Reference Rates**

Over the past few years, regulators, benchmark administrators, and market participants have worked toward improving the resilience of the London Interbank Offered Rate (LIBOR) by subjecting the rate and its administrator to more direct oversight, eliminating little-used currency and tenor pairings, and embargoing the submissions of individual banks to the panel for a three-month period. However, decreases in the volume of unsecured wholesale lending has made it more difficult to firmly ground LIBOR submissions in a sufficient number of observable transactions, creating the risk that publishing the benchmark may not be sustainable. Regulators and market participants have been collaborating to develop alternatives to LIBOR. They are encouraged to complete such work and to take appropriate steps to mitigate disruptions associated with the transition to a new reference rate.

### **Data Quality, Collection, and Sharing**

The financial crisis revealed gaps in the data needed for effective oversight of the financial system and internal firm risk management and reporting capabilities. Although progress has been made in filling these gaps, much work remains. In addition, some market participants continue to use legacy processes that rely on data that are not aligned to definitions from relevant consensus-based standards and do not allow

for adequate conformance and validation to structures needed for data sharing. Regulators and market participants should continue to work together to improve the coverage, quality, and accessibility of financial data, as well as data sharing between and among relevant agencies.

### **Housing Finance Reform**

Fannie Mae and Freddie Mac, two of the housing government-sponsored enterprises (GSEs), are now into their tenth year of conservatorship. While regulators and supervisors have taken great strides to work within the constraints of conservatorship to promote greater investment of private capital and improve operational efficiency with lower costs, federal and state regulators are approaching the limits of their ability to enact wholesale reforms that are likely to foster a vibrant, resilient housing finance system. Housing finance reform legislation is needed to create a more sustainable system that enhances financial stability.

### **Managing Vulnerabilities in an Environment of Low, but Rising, Interest Rates**

In previous annual reports, the Council identified vulnerabilities that arise from a prolonged period of low interest rates. In particular, as investors search for higher yields, some may add assets with higher credit or market risks to their portfolios. They may also use more leverage or rely on shorter-term funding. These actions tend to raise the overall level of financial risk in the economy and may put upward pressure on prices in certain markets. If prices in those markets were to fall sharply, owners could face unexpectedly large declines in their overall portfolio value, potentially creating conditions of financial instability. Although both short-term and long-term interest rates have risen since the last annual report, the consequences of past risk-taking may persist for some time. While the rise in short-term rates has benefitted net interest margins (NIMs) and net interest income at depository institutions and broker-dealers, a flatter yield curve and expectations for higher funding costs going forward may increasingly lower the earnings benefits from higher interest rates. In addition, the transition to higher rates may expose vulnerabilities among some market participants through a reduction in the value of their assets or an uncertain rise in costs of funding for depository institutions. These vulnerabilities can be mitigated by supervisors, regulators, and financial institutions closely monitoring increased risk-taking incentives and risks that might arise from rising rates.

### **Changes in Financial Market Structure and Implications for Financial Stability**

Changes in market structure, such as the increased use of automated trading systems, the ability to quote and execute transactions at higher speeds, the increased diversity in the types of liquidity providers in such markets, and the expansion in trading venues all have the potential to increase the efficiency and improve the functioning of financial markets. But such changes and complexities also have the potential to create unanticipated risks that may disrupt financial stability. It is therefore important that market participants and regulators continue to try to identify gaps in our understanding of market structure and fill those gaps through the collection of data and subsequent analysis. In addition, evaluation of the appropriate use or expansion of coordinated tools such as trading halts across interdependent markets, particularly in periods of market stress, will further the goal of enhancing financial stability, as will collaborative work by member agencies to analyze developments in market liquidity.

### **Financial Innovation**

New financial market participants and new financial products can offer substantial benefits to consumers and businesses by meeting emerging needs or reducing costs. But these new participants and products may also create unanticipated risks and vulnerabilities. Financial regulators should continue to monitor and analyze the effects of new financial products and services on consumers, regulated entities, and financial markets, and evaluate their potential effects on financial stability.

### 3.1 Cybersecurity

Financial institutions continue to invest in technology to increase efficiency and improve their services. However, greater reliance on technology, particularly across a broader array of interconnected platforms, increases the risk that a cyber incident will have severe negative consequences for financial institutions. If severe enough, a cybersecurity failure could have systemic implications for the financial sector and the U.S. economy more broadly.

Identifying cybersecurity risks and the systemic implications of potential cybersecurity failures requires a deep understanding of the financial services sector's operations, complexities, and interdependencies. The fact that the sector is overwhelmingly owned and operated by the private sector makes the need for a close partnership between government and industry important to better understand these risks. Such a partnership helps maintain the integrity of U.S. financial markets and the health of the U.S. economy.

The Council underscores the necessity of sustained senior-level attention on cybersecurity risks and their potential systemic implications. To bolster understanding of these risks and improve cybersecurity resilience, the Council supports the creation of a private sector council of senior executives that would focus specifically on ways that cyber incidents could impact business operations and market functioning and liaise with principal-level government counterparts on cybersecurity issues. This council could help identify specific vulnerabilities in the sector's ability to provide critical products and services and propose standards for cybersecurity and operational resilience.

Additionally, the Council recommends that:

1. Government and industry continue to work together, leveraging existing programs where possible, to enhance financial sector companies' ability to mitigate vulnerabilities and maintain a strong cybersecurity posture;
2. Agencies continue to support efforts to implement the Automated Indicator Sharing (AIS) program developed by the Department of Homeland Security (DHS) and other efforts to encourage automated information sharing;
3. Agencies work to harmonize cybersecurity supervision and regulation, where appropriate;
4. Congress pass legislation that grants examination and enforcement powers to the SEC, CFTC, FHFA, and NCUA to oversee third-party service providers;
5. The Financial and Banking Information Infrastructure Committee (FBIIC), the public sector body dedicated to improving the reliability and security of financial sector infrastructure, continue to promote processes to strengthen response and recovery efforts while working closely with partners to carry out regular cybersecurity exercises; and
6. Treasury and the relevant agencies work with international partners in appropriate forums, such as the G-7 and G-20, on programs to strengthen financial cybersecurity, such as to promote a common lexicon to facilitate consistent discussion of cybersecurity matters.

## Information Sharing

Sharing timely and actionable cybersecurity information among private sector firms and the government remains a key priority. Enhanced public-private partnerships have improved information sharing processes. This sharing reduces the risk that cybersecurity incidents occur and mitigates their impact when they do occur. Sharing cybersecurity information, including “indicators” of potential threats, can have a number of security benefits. For example, one type of indicator can be used to reduce the time needed to discover that a compromise has occurred so that further damage can be avoided. Another can block attacks using known malware.

The Council supports the ongoing coordination and communications work of the FBIIC and encourages the body to undertake additional action. Specifically, the Council recommends that the FBIIC increase the range of cybersecurity information shared among government agencies, with an emphasis on information that can be used to improve the cybersecurity posture of the sector and protect the sector’s critical infrastructure from operational disruption. This information could range from technical indicators, exploits, or artifacts; to tactical information regarding adversary behavior; to vulnerabilities and exposures; and may include non-public information, where appropriate and subject to prudent restrictions on its dissemination. Sharing of this cybersecurity information will provide a better understanding of operational risks within and across the sector, enabling improved risk-mitigation efforts, and a more consistent approach to enhancing the sector’s security and resilience.

In addition, the Council supports continued government efforts to automate the flow of cybersecurity and threat information to the private sector, allowing valuable information to reach potentially vulnerable companies and organizations faster. For example, the DHS established its AIS program, which enables the provision of cyber threat indicators, such as malicious Internet Protocol addresses, from the government to the private sector. The Council recommends that agencies continue to support efforts to implement the AIS program and other efforts to encourage automated information sharing.

Most cybersecurity information sharing between government and industry is conducted at the unclassified level. Agencies should continue to prioritize efforts to ensure that actionable information can be made available in an unclassified format. However, certain information must remain classified. For this information, a key policy challenge is balancing the need to keep information secure with efforts to share information with industry to enhance cybersecurity resilience. Treasury and relevant agencies, through DHS, should carefully consider how to share information appropriately and, where possible, continue efforts to declassify (or downgrade classification) to the extent practicable, consistent with national security needs.

## Baseline Protections

Baseline protections aid in the establishment of cybersecurity risk management programs to increase situational awareness, elevate cyber-risk governance practices, and reduce supply-chain risk. Public and private sector efforts to enhance and promote baseline protections, including the creation of a common lexicon for cyber risk discussions, remains fundamental.

The National Institute of Standards and Technology (NIST) Framework for Improving Critical Infrastructure Cybersecurity (Framework) provides a thematic outline of cybersecurity functions and desired outcomes to reduce risk. Although the Framework is an evolving guide that is not designed to serve as a regulatory standard, it establishes a useful common lexicon for businesses to discuss their approaches to cybersecurity.

The Council also encourages the financial regulators to remain actively engaged with NIST as various NIST publications are updated, including the Framework. As cybersecurity supervision evolves, the Council recommends that financial regulators establish a harmonized risk-based approach utilizing the Framework and common lexicon, which can be leveraged to assess cybersecurity and resilience at the firms they regulate. In addition, financial regulators should harmonize the development of any specific cybersecurity rules and guidance domestically, as appropriate. Such efforts will further reinforce efforts by diverse stakeholders to promote baseline protections across the sector.

The Council supports approaches to creating a common lexicon within both the domestic and international financial sectors. Work was initiated in this regard with the release of the G7's Fundamental Elements of Cybersecurity for the Financial Sector, which drew upon the NIST Framework and the approaches of other G7 countries to create a succinct set of non-binding effective cybersecurity risk management practices for public and private entities.

Financial institutions are increasingly reliant on a global supply chain, particularly with regard to use of technology service providers. Maintaining confidence in the security practices of third-party service providers has become increasingly important, particularly since financial institutions are often serviced by the same providers. The Council encourages additional collaboration between government and industry on addressing cybersecurity risk related to third-party service providers, including an effort to promote the use of appropriately tailored contracting language.

Finally, the authority to supervise third-party service providers continues to vary across financial regulators. The Council supports efforts to synchronize these authorities and enhance third-party service provider information security. The Council recommends that Congress pass legislation that grants examination and enforcement powers to the SEC, CFTC, FHFA, and NCUA to oversee third-party service providers and encourages coordination among federal and state regulators in the oversight of these providers. This will both reduce potentially conflicting and duplicative regulatory oversight and promote more consistency in cybersecurity.

### Response and Recovery

The sector's ability to rapidly respond to and recover from significant cybersecurity incidents is critical to reducing the potential for such incidents to threaten financial stability. The FBIIC continues to be a central venue for enabling response and recovery coordination. The Council recommends that the FBIIC continue to promote processes to enable and strengthen response and recovery efforts, including efforts to address the systemic implications of significant cybersecurity incidents. It is important that this work include emphasis on attaining a level of cybersecurity and operational resiliency in the sector that reduces the likelihood of a systemic disruption of business activity or significant exfiltration of data. Furthermore, the Council encourages FBIIC agencies to jointly catalog and analyze regulatory tools, expertise, and authorities to respond to a cybersecurity incident and address any identified gaps.

Incident response and recovery processes must be well practiced in order to be timely and effective. Responding to a significant financial sector incident could involve a diverse set of agencies and companies that may not work together routinely, absent specific frameworks to encourage such collaboration. Accordingly, the Council recommends that the FBIIC continue to work closely with DHS, law enforcement, and industry partners to carry out regular cybersecurity exercises recognizing the interdependencies among other sectors, such as telecommunications and energy, and encourages continued involvement in such efforts.

## 3.2 Asset Management Products and Activities

In April 2016, the Council issued an update on its review of potential risks to financial stability that might arise from asset management products and activities. In that update, the Council focused primarily on potential threats and vulnerabilities in the areas of liquidity and redemption risk and the use of leverage.

### Liquidity and Redemption Risk

As discussed in **Section 5.5.3**, the Council's April 2016 update suggested a number of steps that should be considered to mitigate potential financial stability risks associated with liquidity and redemption risk from pooled investment vehicles. Since the publication of the update, as described in **Sections 5.2.3 and 5.4.1**, the SEC has finalized a number of rules designed to promote effective liquidity risk management, provide for enhanced data reporting, and permit the use of swing pricing under certain circumstances. The Council recommends that the SEC monitor the implementation of these rules to evaluate whether the chosen regulatory approach addresses potential risks effectively and efficiently.

### Leverage Risk

Leverage, which can be obtained through borrowing, securities financing transactions, or derivatives, can be a useful component of an investment strategy, and its use can imply varying levels of risk depending on the activities and strategies of the investment vehicle. The Council's analysis focused on the potential vulnerability of assets purchased with borrowed short-term funds to selling pressures in stress conditions, as well as on the exposures and interconnections to other market participants created by leverage. The Council update noted that existing SEC guidance limited the ability of registered funds to obtain leverage through repos and certain other financing transactions. In December 2015, the SEC issued a proposed rule on the use of derivatives by registered investment companies. Commenters have raised a number of questions regarding this proposed rule, including concerns that the measures for derivatives exposure did not adequately reflect portfolio risk. The Council recommends that the SEC consider the proposed measures and approach, including whether the proposal addresses risk effectively and efficiently.

As discussed in **Section 5.5.3**, in November 2016, the Council's interagency hedge fund working group provided an update on its findings and noted that additional data and improved data sharing among relevant regulators would be necessary to better assess potential risks to financial stability posed by hedge funds. The Council recommends that relevant agencies review their data collections and assess whether they are sufficient to allow the Council to monitor whether and how hedge funds may pose risks to financial stability.

## 3.3 Capital, Liquidity, and Resolution

As discussed in more detail in **Section 4.11.1**, since the financial crisis many financial institutions have become more resilient to potential disruptions. They have done so, in part, by: raising more capital; taking steps to ensure that they have sufficient liquid assets to withstand greater demands for funding withdrawals; improving loan portfolio quality for residential real estate; implementing better risk management practices; and developing plans for their orderly resolution. Financial regulatory agencies have developed and implemented rules intended to further increase the robustness of these institutions and enhance financial stability (see **Section 5.1.1**). The Council recommends that financial regulators ensure that the largest financial institutions have sufficient capital and liquidity to reduce their vulnerability to economic and financial shocks. The Council also recommends that regulators continue to monitor and assess the impact of rules on financial institutions and financial markets, including market liquidity. The Council further recommends that the appropriate regulatory agencies continue to review resolution plans submitted by large financial institutions, provide guidance to such institutions, and ensure there is an effective mechanism for resolving large, complex institutions.

### 3.4 Central Counterparties

As the Council has noted in previous annual reports, CCPs can improve financial stability by enhancing market functioning, reducing counterparty risk, and increasing transparency. These benefits require that CCPs be highly robust and resilient. Financial regulators and CCP management have made considerable progress in improving risk management practices and providing greater transparency in the functioning of these institutions, including systemically important CCPs. Due to the increasingly important role CCPs play in financial markets, effective regulation and risk management of CCPs is essential to financial stability, and should continue to evolve accordingly.

The Council continues to recommend that the CFTC, Federal Reserve, and SEC coordinate in the supervision of all CCPs that are designated by the Council as systemically important FMUs. In addition, these agencies could work to streamline the process for advance notice review that designated FMUs, including CCPs, must undergo before implementing rule changes. Member agencies should continue to evaluate whether existing rules and standards for CCPs and their clearing members are sufficiently robust to mitigate potential threats to financial stability, in consultation with each other and the Council. Member agencies should also continue working with global counterparts and international standard-setting bodies to identify and address areas of common concern as additional derivatives clearing requirements are implemented in other jurisdictions.

Evaluating how CCPs perform under stress scenarios is a useful tool for assessing the robustness and resilience of such institutions and determining potential operational areas for improvement. The recent stress testing exercises conducted by the CFTC and by regulators in other jurisdictions therefore constitute a very important step in improving regulatory oversight of these institutions and evaluating their risk management practices (see **Box D**). The Council encourages further development of supervisory stress tests and consideration of whether collaboration across regulators, both domestic and international, on future exercises would yield advantages. In addition, the Council continues to encourage stakeholders to engage in CCP tabletop exercises that would simulate stress scenarios in an informal setting, such as liquidity, operational, and cyber risks. Such exercises could improve coordination and identify ways to mitigate the impact of a default of clearing members across multiple CCPs.

The Council also continues to encourage agencies, in particular the CFTC, SEC, and Federal Reserve, to monitor and assess interconnections among CCPs, their clearing members, and other financial institutions. They should consider the potential effects of distress of one or more of these entities on other stakeholders in the clearing system and on financial stability, with an eye towards identifying measures that would enhance the resilience of the financial system and financial stability.

Recent disclosures by many CCPs as a result of the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) quantitative disclosure standards, discussed in **Section 5.4.1**, have increased transparency substantially for both the public and clearing members. Regulators should consider additional improvements in public disclosure that are comparable across CCPs that allow market participants to measure and monitor their exposures to CCPs, in particular with respect to CCPs' margin and stress testing methodologies.

Finally, the Council continues to encourage regulators to focus on CCP recovery and resolution planning to further develop such plans for systemically important CCPs.



## 3.5 Wholesale Funding Markets

### Repurchase Agreement Markets

As the Council has noted in previous annual reports, progress has been made in the reduction of counterparty risk exposures in markets for repos. At the same time, the Council recommends that financial regulators continue to monitor these markets, given their continued importance in the U.S. financial system. Because the possibility of fire sales of collateral by creditors of a defaulted broker-dealer remains a vulnerability, the Council also recommends assessing the degree to which recent reforms have mitigated this risk. Furthermore, in 2017, the SEC approved a proposal by the Fixed Income Clearing Corporation (FICC) to expand the availability of central clearing in the repo market for certain institutional investors. Central clearing could potentially improve transparency and help mitigate the risk of fire sales in this market.

Key to mitigating vulnerabilities in the repo market is bolstering policymakers' and market participants' understanding of how these markets function, how participants interact, and how risk characteristics are changing. Though visibility into the tri-party repo market has improved in recent years, understanding of the bilateral market should be improved considerably. In addition, the Council recommends that relevant authorities continue to monitor repo markets for any signs of changes in liquidity conditions and assess the impact of such developments on financial stability.

### Money Market Mutual Funds and Other Cash Management Vehicles

As discussed in **Sections 4.13.1, 5.2.3, and Box C**, in October 2016, the SEC implemented reforms of MMFs that were intended to reduce the likelihood of runs on these cash management vehicles. As a result of the reforms, there was a significant shift in the composition of fund assets that impacted certain funding markets. While total assets under management (AUM) were little changed, prime and tax-exempt MMF assets declined sharply and shifted to government MMFs. This shift toward government MMFs, in turn, led to stronger demand for government fund-eligible assets, including Treasury and agency securities, private market repo collateralized by government securities, and repo conducted through the Federal Reserve's overnight reverse repo (ON RRP) facility. The Council, in coordination with the SEC, will continue to monitor the impact of the reforms on other markets and institutions. In light of the approximately \$1 trillion shift from prime MMFs to government funds, particular attention should be paid to monitoring the continued availability of funding for institutions that borrowed from prime MMFs in the past.

In addition, the Council recommends that regulators assess the financial stability risks that might be posed by other types of cash management vehicles. Several other types of cash management vehicles include short-term investment funds, local government investment pools, and some common and collective trust funds. Regulators should consider whether regulatory gaps exist for such vehicles, and evaluate the extent to which additional data would be helpful in monitoring and addressing such gaps. Finally, in light of the regulatory and market developments described above, some institutions may choose to implement new strategies that could produce new risks and vulnerabilities. Regulators should attempt to identify such activities for any financial stability risk implications.

## 3.6 Reforms Related to Reference Rates

While important progress has been made toward improving existing benchmarks, a fall in the volume of transactions in wholesale unsecured funding markets has created weaknesses in the computation of the still widely used interbank offered rates. The Council has previously noted that weak governance structures and the small number of transactions in the unsecured, interbank lending market underpinning reference rates like the LIBOR undermine market integrity and raise financial stability concerns. These concerns,

along with heavy reliance upon LIBOR in particular, have prompted further action by regulators and market participants.

To address these issues, the Council encourages the Alternative Reference Rates Committee (ARRC) to complete its work developing a credible implementation plan to achieve a smooth transition to the Secured Overnight Financing Rate—a broad measure of overnight Treasury financing transactions—as its recommended alternative reference rate. Such a plan should include well-defined targets and, when possible, detailed timelines in order to provide greater certainty to market participants. The Council also encourages market participants to make their legacy contracts referencing LIBOR more robust in the event that the publication of LIBOR were to cease. These steps will minimize potential disruptions that might arise during the transition to a new reference rate, encourage market participants to abide by the proposed terms of the transition, and discourage market participants from divesting contracts tied to old benchmarks in a disorderly manner. The Council recommends that member agencies work closely with market participants to identify and mitigate risks from potential dislocations during the transition process.

### 3.7 Data Quality, Collection, and Sharing

While the financial services industry has long relied on reference data paired with financial transaction data to form the core of financial instrument trading, trade processing, risk management, and regulatory reporting systems, in many cases there is no consensus on how to best standardize these data. In some cases, market participants have developed and applied proprietary naming conventions, formats, and structures to the elements of these data, and in other cases, market participants use various open standards to communicate these data. Use of different standards by different market participants for the same data can lead to costs and inefficiencies, such as duplicate reporting, and may impede the ability to aggregate data for risk management and reporting purposes.

The Council recommends that regulators and market participants continue to work together to improve the coverage, quality, and accessibility of financial data, as well as data sharing between relevant agencies. Data sharing improvements may include developing stronger data sharing agreements; collecting common data using standard methodologies; developing and linking together data inventories; and promoting standard criteria, protocols, and appropriately strong security controls to streamline the secure sharing of datasets.

Further, the Council encourages market participants to use current initiatives, forums, and public-private partnerships, such as the Financial Sector Information Sharing and Analysis Center, Financial Services Sector Coordinating Council, FBIIC, and Sheltered Harbor, to identify existing critical infrastructure protection and cyber threat intelligence data-sharing protocols and standards that could be synchronized across the industry. With regard to information collections more generally, member agencies should be mindful of the extent to which existing and proposed new collections may lead to unnecessary regulatory reporting burdens, and engage each other, their regulated firms, and other financial industry participants to reduce such burdens.

#### Legal Entity Identifier

Broader adoption of the Legal Entity Identifier (LEI) by financial market participants continues to be a Council priority. The LEI enables unique and transparent identification of legal entities participating in financial transactions. The LEI system began collecting Level 2 information in May 2017 (see Section 5.4.2) as entities chose to register for or renew their LEIs, a process that has continued over the succeeding months. Level 2 data include only hierarchy data that is publicly available in cases where the respective parent has its own LEI. With these hierarchy data, the LEI system will provide an additional tool for understanding the complex structures of large companies. To facilitate the broad adoption of the LEI, the Council recommends

that, where appropriate, member agencies move to adopt the use of the LEI in regulatory reporting and other data collections.

### Fostering Improved Data Collection and Sharing

The Council recommends that regulators and market participants continue to work together to improve data collection and sharing, including developing stronger and more flexible data-sharing agreements, collecting common data using industry best practices, developing and linking together metadata catalogs, and reinforcing appropriate and strong security controls to streamline the secure sharing of financial data. As these financial data are gathered and shared, it is important they be in accord with appropriate data standards and sharing approaches to facilitate a common understanding across the spectrum of data users.

### Securities Financing Data

High-quality data covering bilateral transactions in securities financing markets would be valuable for regulators and market participants. Following last year's Council recommendation in this area, and building on the data collection pilot conducted by the OFR, Federal Reserve, and SEC (see Section 4.9.2), the Council encourages efforts to make permanent the collection of data on certain repo and securities lending transactions. The related rule development (see Section 5.4.1) should consider provisions for allowing secure sharing and integration of the data with other member agencies and should weigh the tradeoffs of making appropriately aggregated statistics available to the public.

### Asset Management

Improving the quality of information available to evaluate risks in the asset management industry remains a Council focus. In October 2016, the SEC finalized new disclosures and reporting requirements for mutual funds and other funds it oversees. The final rules require structured reporting on portfolio holdings and various fund characteristics, including a fund's use of derivatives. In August 2016, the SEC adopted amendments to Form ADV to collect data from investment advisers on assets in separately managed accounts. The Council recommends continued efforts among member agencies to promote the consistency of reported information, as well as sharing of data to improve financial stability analysis. The Council also supports efforts to improve metrics and analytical tools used to evaluate asset management risks, as well as continued collaboration among regulators and industry on reporting standards.

### Central Counterparties

Obtaining information that enables the evaluation and monitoring of risks in CCPs remains a Council priority. In response to the public quantitative disclosure standards developed by CPMI-IOSCO in 2015, CCPs have begun to publicly report information on their financial resources. While there have been improvements in public data disclosure about CCPs, there is room for further progress in disclosure. The Council recommends continued efforts among member agencies to promote the consistency of reported information. The Council also supports efforts to determine the degree to which greater data sharing among member agencies concerning CCPs, clearing members, and clearing customers would improve risk monitoring and analysis of CCPs, and to engage in such sharing, where appropriate.

### Swap Data Repositories

The Council recommends that its members and member agencies continue to work to harmonize global derivatives data for aggregation and reporting, and ensure that appropriate authorities have access to trade

repository data needed to fulfill their mandates. In July 2016, the SEC adopted amendments and guidance on regulatory reporting and public dissemination of some swap transactions. In addition, in 2016 the SEC adopted rules implementing the requirement under the Dodd-Frank Act that security-based swap data repositories (SBSDRs) make data available to certain named regulators and other persons designated by the SEC, subject to a confidentiality condition. In December, a CFTC rule refining requirements for reporting of cleared swaps to swap data repositories (SDRs) went into effect. In July 2017, the CFTC released for comment a roadmap for reviewing its swaps reporting regulations, with the goal of improving data quality while reducing burdens on swap counterparties. The roadmap contemplates recommendations regarding the validation of data submitted to SDRs and a move toward standardization of data elements with those of foreign regulators through work leveraging CPMI-IOSCO processes. Revisions to the CFTC swap reporting rules and further alignment of data standards will facilitate analysis of derivatives market activities.

### **Mortgage Data Standards**

The Council recommends that member agencies update their regulatory mortgage data collections to include LEI and universal loan identifier (ULI) fields, which will make it possible to track loan records through a loan's life cycle. The Council also recommends that member agencies support adoption and use of standards in mortgage data, including consistent terms, definitions, and data quality controls, which will make transfers of loans or servicing rights less disruptive to borrowers and investors.

### **Insurance Data**

The Council recommends that state insurance regulators and the NAIC continue their ongoing work to enhance controls on life insurers' use of, and improve the transparency of, captive reinsurance transactions. FIO should continue to monitor and report on issues relating to captive reinsurance transactions.

### **Pensions**

The Council supports efforts by pension regulators and accounting standards boards to improve the quality, timeliness, and depth of disclosures of pension financial statements, and will continue to monitor financial developments in pension plans. The Council also supports the use of market valuation for pension data as described in the guidance issued by the Governmental Accounting Standards Board.

## **3.8 Housing Finance Reform**

The domestic housing market continued to improve over the past year as sales of new and existing homes increased, foreclosures declined, and the share of properties with negative equity fell. Fannie Mae and Freddie Mac have reduced their retained portfolios more than 60 percent below their levels at year-end 2008 and continue to transfer credit risk on at least 90 percent of newly acquired single-family homes in targeted categories. The Council recommends that regulators and market participants continue to take steps to encourage private capital to play a larger role in the housing finance system.

FHFA and the two GSEs have also continued the development of a new housing finance infrastructure, including initial use of the Common Securitization Platform (CSP) and progress toward a single agency mortgage-backed security. The Council recommends that efforts to advance both the CSP and single security continue.

Fannie Mae and Freddie Mac are now into their tenth year of conservatorship. The Council acknowledges that, under existing regulatory authorities, federal and state regulators are approaching the limits of their ability to enact regulatory reforms that foster a vibrant, resilient housing finance system. The Council therefore reaffirms its view that housing finance reform legislation is needed to create a more sustainable system.

### 3.9 Managing Vulnerabilities in an Environment of Low, but Rising, Interest Rates

Although domestic and many foreign interest rates still remain low by historical standards, rates began to rise during the latter half of 2016. The Council has long recognized that a prolonged low-interest-rate environment creates profitability challenges and increases incentives for risk-taking by market participants, which in turn can create other vulnerabilities by heightening asset-valuations. To the extent that asset valuations have been elevated in the low interest rate environment, declines in asset valuations are more likely to materialize and become severe as interest rates return closer to historical norms. The Council therefore continues to recommend that supervisors, regulators, and financial institutions continue to closely monitor and assess the risks resulting from these increased risk-taking incentives.

While a general rise in interest rates could result in improved financial company profitability, it could also be a symptom of or a contributing factor to other risks and vulnerabilities. Such a rise could in principle indicate market perception of additional risk in the economy; however, credit spreads on risky assets have generally continued to fall over the past year. Rising rates will also push down the value of outstanding securities, which confronts current owners with unrealized losses. Given the unusually long period of low interest rates, there is greater uncertainty about the pace at which financial institutions' funding costs will rise in response to increases in market rates and about the behavior of the quantity of deposits and other sources of short-term funding. The Council recommends that supervisors, regulators, and financial institutions continue to monitor and assess risks that might arise from rising rates.

### 3.10 Changes in Financial Market Structure and Implications for Financial Stability

Changes in the way that financial markets work, such as the increased use of automated trading systems, the increased speed of executing financial transactions, and a wider variety of trading venues and liquidity providers, have the potential to make financial markets more efficient and transparent. Such changes and complexities also have the potential to create unanticipated risks, which may disrupt financial stability. It is therefore important that financial regulators continue to monitor and evaluate any changes which might have adverse effects on market functioning as well as any impact on trading liquidity.

A key component of these efforts is to identify the gaps in our understanding of market structure and, if necessary, to fill these gaps through the collection of data and subsequent analysis. Such efforts are underway. The reporting of secondary transactions in Treasury securities through the Trade Reporting and Compliance Engine (TRACE) has the potential to promote greater understanding of, and transparency in, the Treasury market (see **Box E**). The Council supports this development and encourages the assessment of other areas in which improved data-gathering might be fruitful. In particular, important areas to study include cases where underlying sources of risks may have similar impacts across different products.

Finally, the Council encourages member agencies to continue to evaluate the use of coordinated tools such as trading halts across interdependent markets, particularly in periods of overall market stress, operational failure, or other incidents that might pose threats to financial stability, while being mindful of the tradeoffs such tools might entail. The recent memorandum of understanding signed by the Inter-Agency Working Group for Market Surveillance, which includes several Council member agencies, to formalize data and information sharing on the Treasury markets should enhance efforts to monitor these markets. Council member agencies should also work collaboratively to analyze developments in market and trading liquidity.

### 3.11 Financial Innovation

The entry of new financial market participants and development of new financial products and services offers benefits to firms, households, and financial institutions. Innovation allows market participants to adapt to evolving marketplace demands and regulatory constraints and offers the possibility of reducing transaction costs, increasing credit availability, improving efficiency, and allowing for the more accurate pricing of risks. But new applications of technology, as in other parts of the economy, can be disruptive and can create risks and vulnerabilities that are difficult to anticipate. Accordingly, the Council encourages financial regulators to continue to identify and study new products and services in order to understand how they are used and can be misused, monitor how they affect consumers, regulated entities, and financial markets, and coordinate regulatory approaches, as appropriate. Examples of such new products and services include virtual currencies, distributed ledger technologies, and marketplace lending. The Council should also evaluate the potential effects of new financial products and services on financial stability, including operational risk.

### 3.12 Regulatory Efficiency and Effectiveness

While the regulatory environment has contributed to improvements in financial stability and the resiliency of financial institutions since the financial crisis, new regulations have also raised concerns about increased compliance costs and regulatory burdens for financial institutions, especially for smaller institutions. Over the past year, the OCC, the FDIC, and Federal Reserve completed their review, pursuant to EGRPRA, to identify outdated or unnecessary regulations and consider how to reduce regulatory burden on insured depository institutions while, at the same time, ensuring their safety and soundness and the safety and soundness of the financial system. The NCUA conducted a review of its regulations at the same time and in a manner consistent with the EGRPRA review. The CFPB formally launched the first three assessments of its recent significant rulemakings as mandated by the Dodd-Frank Act. Other Council member agencies underwent or are undertaking their own internal review of agency rules, regulations, and practices to identify those areas that can be simplified to make them less burdensome and less costly. Council member agencies also, for example, proposed reducing reporting requirements, raising appraisal thresholds, and simplifying capital rules and coordinated efforts to address unintended consequences of the Volcker Rule (**see Section 5.1.1 and Section 5.1.4**). The Council recommends that regulators continue to evaluate regulatory overlap and duplication, modernize outdated regulations, and, where authority exists, tailor regulations based on the size and complexity of financial institutions.



# 4

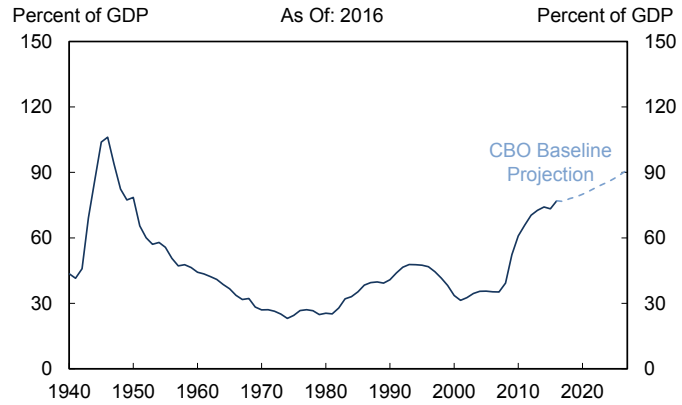
## Financial Developments

### 4.1 U.S. Treasuries

Publicly held U.S. sovereign debt outstanding grew to \$14.8 trillion as of October 2017. Public debt outstanding as a share of gross domestic product (GDP) rose to 77 percent over the fiscal year (**Chart 4.1.1**). The Congressional Budget Office (CBO) baseline projects publicly held debt to remain below 79 percent through 2019 before rising to 91.2 percent by 2027. The average maturity of outstanding marketable debt rose from 69 months at year-end 2015 to 71 months as of third quarter 2017. Japan and China are the largest foreign holders of U.S. sovereign debt at a combined \$2.3 trillion, or 36 percent of total foreign holdings as of September 2017.

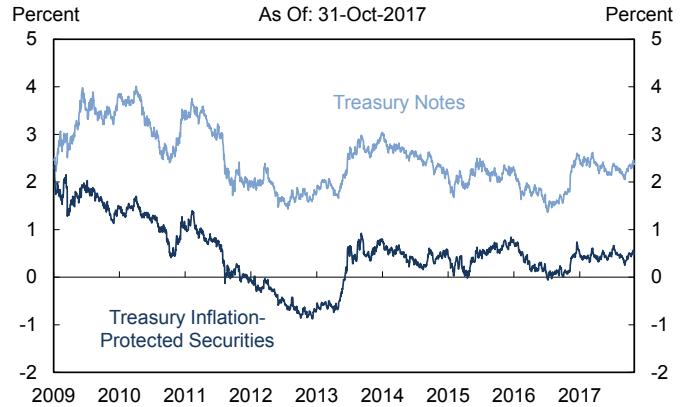
The Treasury yield curve flattened in the first half of 2016 due to lower longer-maturity Treasury yields but steepened later in 2016 with interest rates rising across the yield curve. The flattening was largely driven by global growth concerns and increased risk of lower inflation contributing to increased foreign demand for Treasury securities. The 10-year Treasury note yield closed at a record low of 1.37 percent in July 2016, after the UK referendum on June 23 regarding membership in the EU (**Chart 4.1.2**). The increase in yields later in 2016 was particularly sharp after the U.S. presidential election in November, with the 10-year yield rising by 74 basis points to a peak of 2.62 percent in March 2017. Market participants noted higher expectations for Federal Reserve policy rates and inflation outcomes as well as an increase in the term premium driven by expectations for expansionary fiscal policy as important factors driving the rise in the 10-year Treasury yield. The 10-year Treasury yield has since fallen off its peak in March and is at 2.38 percent as of October 2017. The Treasury yield

#### 4.1.1 Federal Debt Held by the Public



Source: CBO, Haver Analytics Note: Data for fiscal years. Years after 2016 are projected.

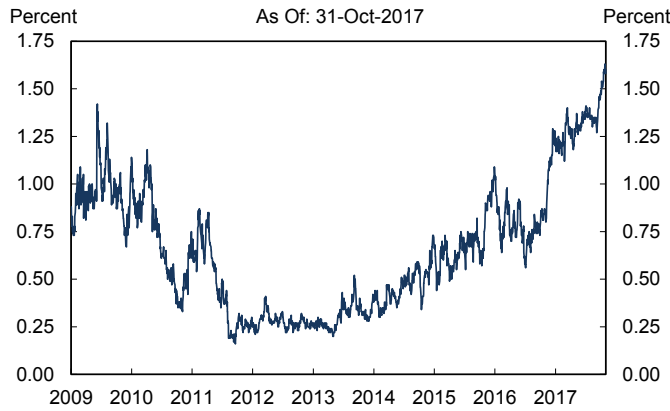
#### 4.1.2 10-Year Treasury Yields



Source: U.S. Department of the Treasury



### 4.1.3 2-Year Treasury Yields



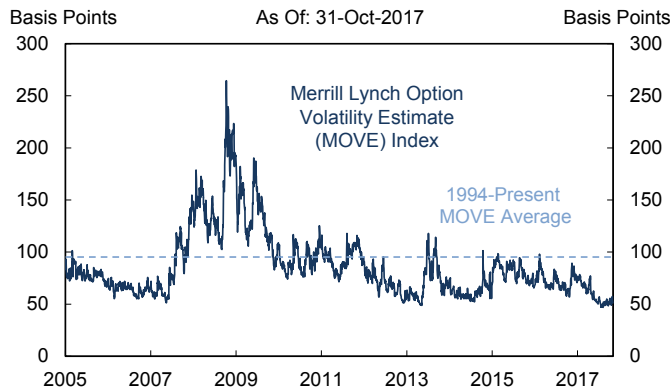
Source: U.S. Department of the Treasury

curve has flattened in 2017 as short-term rates have continued to rise.

Since the beginning of 2016, the real yield on 10-year Treasury Inflation-Protected Securities (TIPS) has fallen 23 basis points to 0.50 percent. Break-even inflation compensation, the difference between nominal and TIPS yields, rose over the period, peaking in early 2017. Break-even inflation compensation has declined more recently amid below expectations inflation data.

Yields on 2-year Treasury notes fell in the first half of 2016, reaching a low of 0.56 percent in July before reversing course (**Chart 4.1.3**). The 2-year Treasury yield has since risen 104 basis points to 1.60 percent, as of October 2017. The Federal Open Market Committee (FOMC) raised its target range for the federal funds rate 25 basis points four times since December 2016. Also, in October 2017, the Federal Reserve began normalizing its balance sheet. Implied fixed income volatility, as measured by prices of options on U.S. Treasuries, was below its long-term average throughout 2016 and 2017 (**Chart 4.1.4**).

### 4.1.4 Fixed Income Implied Volatility



Source: Bloomberg, L.P.

Note: Implied volatility is calculated using a yield curve-weighted index of the normalized implied volatility on 1-month Treasury options.

The three major credit rating agencies maintained their overall ratings and stable outlook on U.S. sovereign debt unchanged since the Council's last annual report.

## 4.2 Sovereign Debt Markets

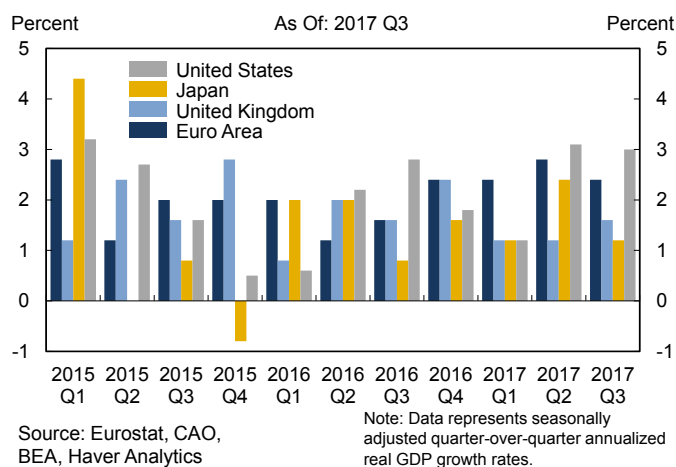
### 4.2.1 Developed Economies

Economic growth slowed slightly throughout much of the developed world in 2016, but rebounded in the first three quarters of 2017 (**Chart 4.2.1**). U.S. real GDP grew 1.5 percent in 2016, down from a 2.9 percent pace in 2015, supported by a moderate expansion in consumer spending and higher incomes. Continued labor market strength helped lift U.S. real GDP in 2017, with annualized growth reaching 3.0 percent in the third quarter. In general, growth rates in advanced economies remain modest relative to their pre-crisis averages (**Chart 4.2.2**).

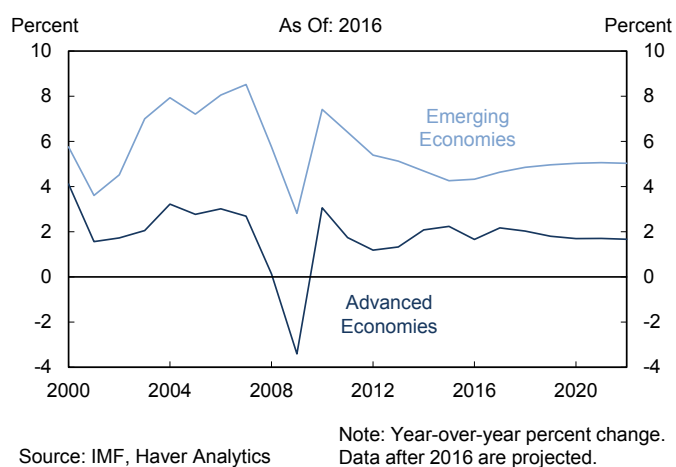
Yields in developed economies declined for most of 2016 and remained at subdued levels in 2017, despite increasing briefly after the U.S. presidential election. In several developed economies abroad, which in some instances have different approaches to market operations than in the United States, central banks in 2016 held to their longstanding accommodative monetary policy stances by maintaining very low policy rates and continuing large-scale asset purchases. The European Central Bank (ECB) and the Bank of Japan (BoJ) left nominal interest rates in negative territory to combat disinflationary risks and low growth, and the BoJ also began yield-targeting across the interest rate curve, with a target of around 0 percent for 10-year bonds. The Bank of England (BoE) announced an expansion of its quantitative easing program in August 2016, and the ECB increased its pace of asset purchases from April 2016 to March 2017.

In 2017, central banks in certain developed economies began to tighten monetary conditions. In November 2017, the BOE raised its official Bank Rate to 0.5 percent, and in July and September of 2017, the Bank of Canada announced two consecutive rate hikes, bringing its target overnight rate to 1.0 percent. Additionally, in October 2017, the ECB announced it would decrease the pace of asset purchases, but extend the program's

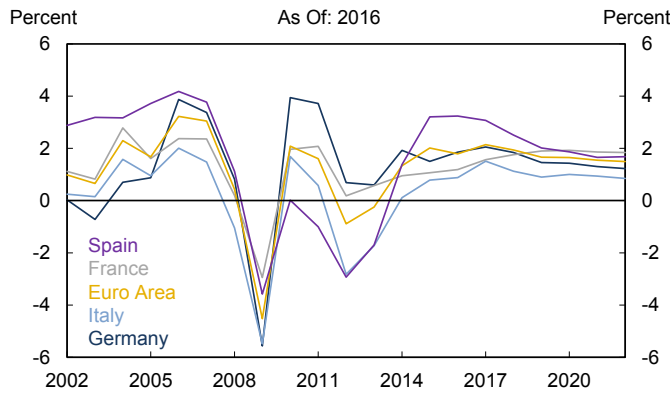
### 4.2.1 Advanced Economies Real GDP Growth



### 4.2.2 Real GDP Growth

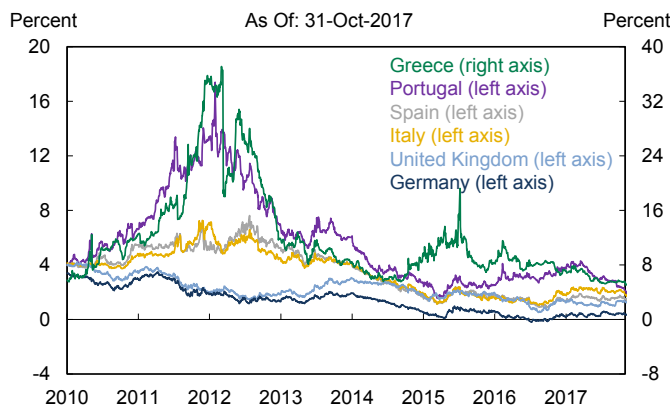


### 4.2.3 Euro Area Real GDP Growth



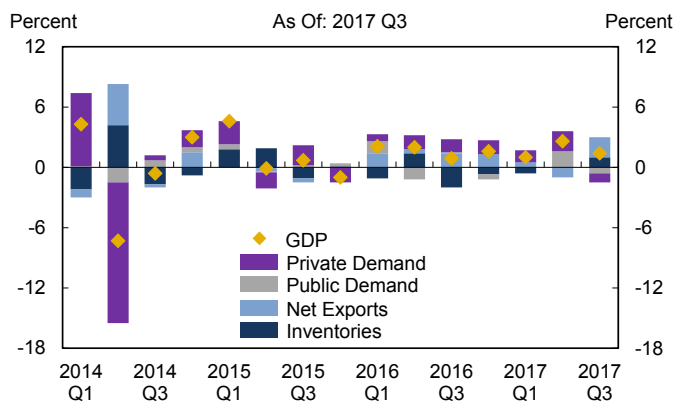
Source: IMF, Haver Analytics Note: Year-over-year percent change. Data after 2016 are projected.

### 4.2.4 European 10-Year Yields



Source: Bloomberg, L.P.

### 4.2.5 Contributions to Japanese GDP Growth



Source: Cabinet Office of Japan, Haver Analytics Note: Data represents seasonally adjusted quarter-over-quarter annualized real GDP growth rates.

length to September 2018. The Federal Reserve, meanwhile, raised its target range for the federal funds rate (in December 2016, March 2017, June 2017, and December 2017) and began reducing the size of its balance sheet in October 2017.

#### Euro Area

Real GDP growth slowed in the euro area to 1.8 percent in 2016, down from 2.0 percent in 2015, driven by slower growth in smaller and peripheral countries. However, growth has since accelerated, reaching an annualized rate of 2.4 percent in the third quarter of 2017, supported by stronger global economic conditions and lower unemployment in the euro area. Amongst the larger euro area countries, Spain continued to see the strongest recovery (**Chart 4.2.3**). European banks, particularly in Italy, were a source of macroeconomic uncertainty in 2016 and 2017 (**see Box A**).

Yields in larger European countries changed little on balance in 2017 despite some volatility around the June 2016 UK referendum to leave the EU (**Chart 4.2.4**). While shorter-term core sovereign bond yields remained negative for most of 2016 and 2017, spreads to German Bunds widened in late 2016 and early 2017 for several European countries. For example, Portuguese and Italian yield spreads widened due to fiscal, political, and banking sector risks, and in the lead up to the French presidential election, the French yield spreads to Germany widened to their highest level since 2012. Italian, Portuguese, and French yield spreads to Germany have since tightened on stronger economic growth expectations and reduced political uncertainty.

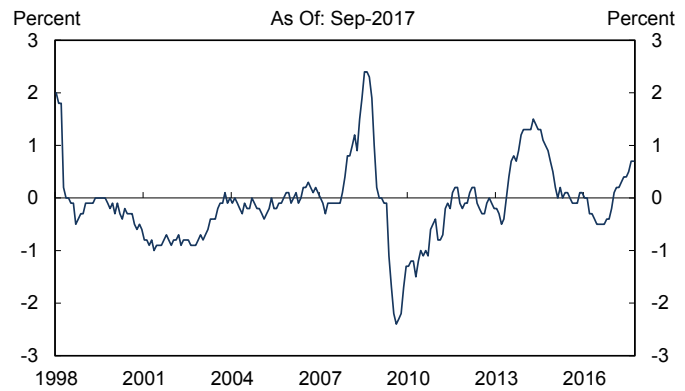
#### Japan

The Japanese economy grew by 1.0 percent in 2016, and accelerated moderately in the first three quarters of 2017 (**Chart 4.2.5**). Private demand and exports were the primary sources of Japanese GDP growth over this period. The yen appreciated significantly for most of 2016 but fell sharply after the U.S. presidential election, having recovered somewhat over the following year. Consumer price inflation was

negative for nearly all of 2016 but has since turned positive, though it remains very low (Chart 4.2.6).

Japanese 10-year government bond yields reached a record low of negative 30 basis points in July 2016, before rising over the next few months. Rates have hovered just above zero for most of 2017, in line with the BOJ's 10-year yield target.

#### 4.2.6 Japanese Consumer Price Inflation



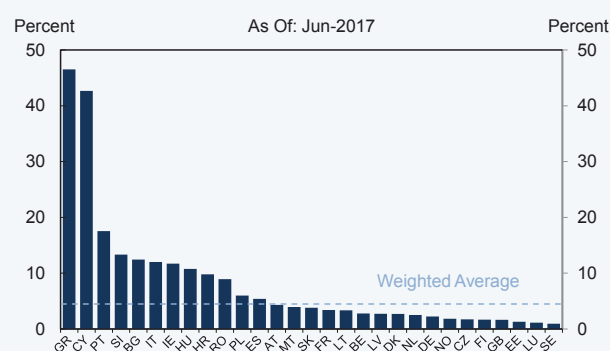
Source: Bank of Japan, Haver Analytics

Note: Data represents year-over-year percent change. CPI is adjusted for the consumption tax increase that took effect in April 2014.

## Box A: European Banking Sector Developments

Low profitability and poor asset quality posed challenges for European banks in 2016, contributing to market volatility and macroeconomic uncertainty in the region. Although recovering somewhat in 2017, European banks have witnessed depressed share prices and low price-to-book (P/B) ratios in recent years, as investors remained concerned about profitability and potential shortfalls in capital. Banks' contingent convertible bonds—those that pay interest only if capital or income levels remain above certain thresholds—experienced considerable price volatility in 2016.

### A.1 European Non-Performing Loan Ratios



Source: European Banking Authority

Note: Ratio of non-performing loans and advances to total gross loans and advances. Weighted averages by country.

Several factors have driven bank earnings to low levels. Low interest rates have weighed on net interest income, as floors on deposit rates have constrained NIMs. In addition, European authorities note that overcapacity, structural rigidities, and outdated business models have hampered efforts to cut costs and identify new revenue opportunities in a post-crisis landscape. European banks reported an average return on equity (ROE) of approximately 5 percent in 2016, a rate below their estimated cost of capital, although profitability improved somewhat in the first half of 2017. Low earnings constrain banks' ability to absorb shocks through retained earnings and to raise

new capital, making the availability of credit more precarious.

Poor asset quality remains a significant challenge for banks in certain jurisdictions, particularly peripheral countries, making it difficult for investors to assess the health of banks and complicating efforts to raise new capital. At the end of 2016, nonperforming loans constituted more than 13 percent of total loans in one quarter of EU countries, a ratio several times larger than in many European core countries and other developed economies. However, this ratio fell to 9.1 percent by June 2017 (**Chart A.1**). High levels of nonperforming loans could increase net charge-offs as banks write them off balance sheets, and in severe cases could present solvency concerns.

European authorities recognize that addressing the quantity of nonperforming loans, such as through supervisory actions, structural reforms, and development of secondary markets, is crucial. However, despite certain efforts to identify a solution that could address banking issues across the EU, varying conditions across EU member states—including differences in asset quality, debt resolution mechanisms, and bankruptcy regimes—and political constraints make finding such a solution challenging.

EBA stress tests results released in July 2016 revealed that, in a severe stress scenario, capital ratios for several banks could fall substantially below minimum requirements. Banks have subsequently improved risk-weighted capital ratios in 2016 and 2017, partially mitigating the vulnerabilities associated with low profitability and large nonperforming loans. The fully-loaded common equity tier 1 (CET1) ratio of the largest EU banks increased from 13 percent to 14 percent between December 2015 and June 2017. Higher capital ratios were driven by both increases in internally generated capital, such as through retained earnings and smaller dividend payouts, and declines in risk-weighted assets (RWAs), as banks continue to

recognize loan losses and absorb non-current costs. However, these levels may understate vulnerabilities given European banks' low ratios of RWAs to total assets and low leverage ratios, the latter averaging approximately 5 percent across the EU.

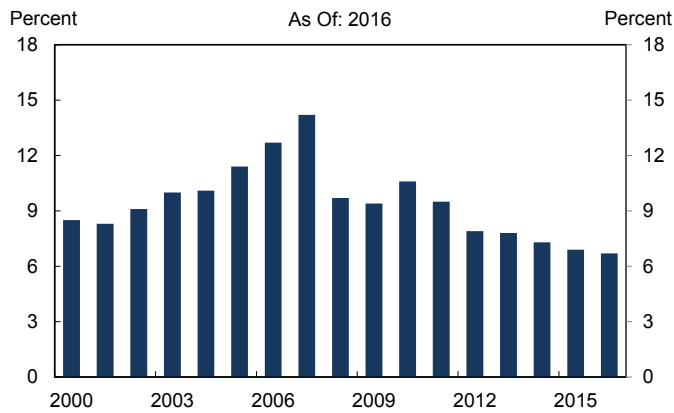
European authorities have attempted to address bank-related concerns in a variety of ways. In November 2016, to strengthen the resilience of EU banks, the European Commission proposed a broad package of bank regulation that incorporates remaining elements of the G20 prudential regulatory reform agenda into the EU bank supervision and regulation regime. European authorities have not yet finalized legislation to establish a European deposit insurance scheme, which could help reduce vulnerability of national deposit guarantee schemes to local shocks and reduce spillover risk between sovereign nations and their banking sectors.

European banking authorities have adapted their application of rules and regulations to alleviate some market concerns about the rigidity of the EU banking framework. The decision by the ECB's supervisory authority to introduce more flexible, bank-specific capital requirements has eased market concerns about automatic restrictions on dividend and interest distributions. Furthermore, initial cases of bank recovery and resolution in Italy and Spain suggest that officials have flexibility within the EU Bank Recovery and Resolution Directive and state aid framework to address banking system fragilities.

Changes in international accounting standards are also expected to impact the European banking sector. On July 24, 2014, the International Accounting Standards Board (IASB) issued International Financial

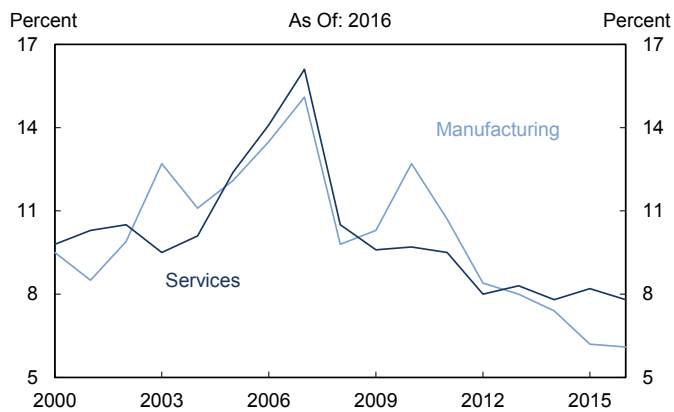
Reporting Standard (IFRS) 9, which becomes effective on January 1, 2018. The new standard will affect non-U.S. financial institutions in addition to any company with certain types of financial assets, including loans and receivables applying IFRS. IFRS 9 introduces a new classification and measurement principle for financial assets, a new impairment model that will accelerate recognition of credit losses, and a change in hedge accounting.

#### 4.2.7 Chinese Real GDP Growth



Source: China National Bureau of Statistics, Haver Analytics  
Note: Year-over-year percent change.

#### 4.2.8 Chinese Manufacturing and Services Growth



Source: China National Bureau of Statistics, Haver Analytics  
Note: Year-over-year percent change.

#### 4.2.9 Chinese Equity Market (CSI 300 Index)



Source: Capital IQ

#### 4.2.2 Emerging Market Economies

Economic growth in emerging markets picked up slightly in 2016 and early 2017, following sluggish growth in preceding years. Southeast Asian economies expanded robustly, while northeast Asian economies grew at a more modest pace, in part due to slowing trade. Following recessions in recent years due to sharp declines in commodity prices, several Latin American economies continued to struggle due to weak consumer and business confidence, tight macroeconomic policies, and other factors.

##### China

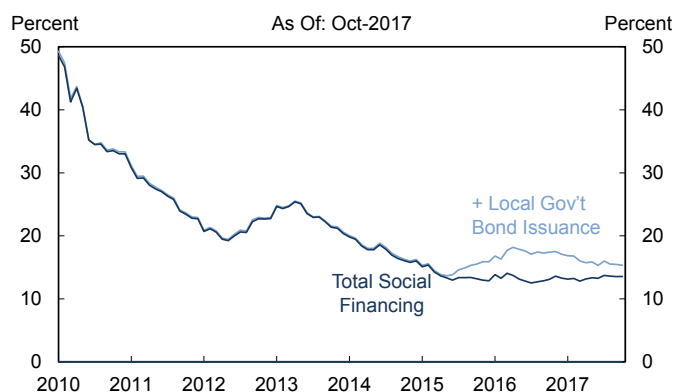
Despite slowing slightly to 6.7 percent in 2016 (**Chart 4.2.7**), real GDP growth in China edged higher to 6.8 percent in the first three quarters of 2017, driven by continued credit expansion, real estate investment, and fiscal spending. While growth in the manufacturing sector continued to underperform the services sector, manufacturing sector growth stabilized in 2016, supported by lower real interest rates and strong industrial profits in the second half of the year. Services sector growth slowed modestly in 2016 (**Chart 4.2.8**). Over the first three quarters of 2017, the manufacturing and services sectors grew somewhat faster than over the same period in 2016. Chinese equity market volatility in 2016 and 2017 was considerably more subdued than in 2015 (**Chart 4.2.9**). The rate of total credit growth accelerated to 17.1 percent in 2016, primarily driven by an increase in nonbank credit, and edged slightly lower in 2017 (**Chart 4.2.10**). Total nonfinancial private credit rose above 200 percent of GDP, driven by increased investment demand in real estate, infrastructure, and manufacturing in recent years (**Chart 4.2.11**).

## Emerging Market Debt

After experiencing net foreign investor outflows in late 2015, emerging market economies (EMEs) were net recipients of foreign investor capital in 2016 and early 2017, in line with the slight pickup in EME growth (**Chart 4.2.12**). Gross bond issuance in 2016 and 2017 rebounded from the low level posted in 2015 (**Chart 4.2.13**). Issuance was sizable from a number of countries that infrequently borrow from public markets, including Argentina and Saudi Arabia. Net bond issuance showed a somewhat smaller increase than gross issuance due to increasing maturities.

Bond spreads in most countries narrowed or remained flat in 2016 and 2017, though they temporarily widened following the U.S. election (**Chart 4.2.14**). While China witnessed substantial widening in corporate bond spreads in late 2016 and early 2017, the selloff in corporate bonds mostly ebbed by mid-2017.

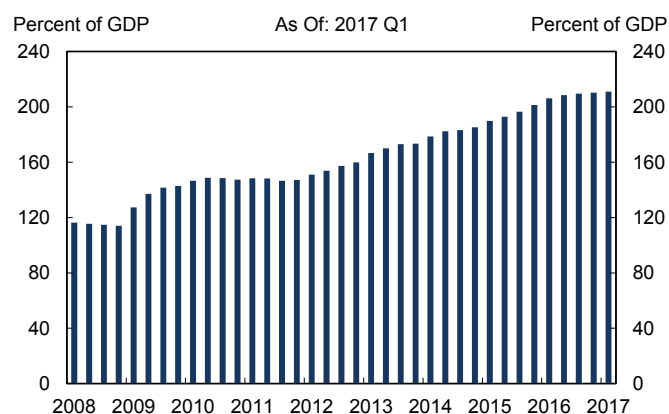
### 4.2.10 Chinese Credit Growth



Source: The People's Bank of China, Haver Analytics

Note: Year-over-year monthly change. Total credit is defined as the sum of total social financing (TSF) and local government bond issuance. TSF refers to the total volume of financing provided by the financial system to the real economy.

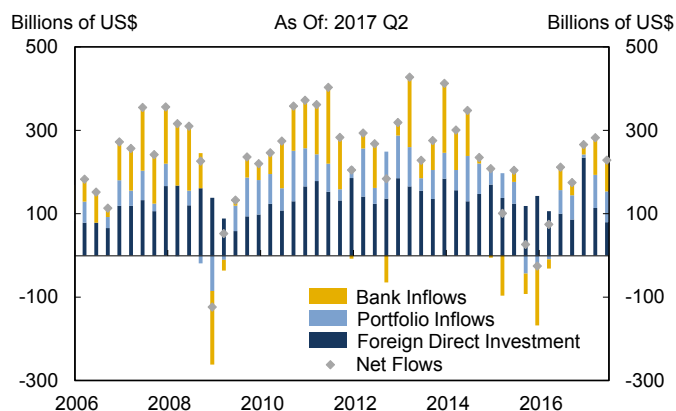
### 4.2.11 Credit to the Chinese Nonfinancial Private Sector



Source: China National Bureau of Statistics, BIS, Haver Analytics

Note: Rolling 4-quarter sum of GDP.

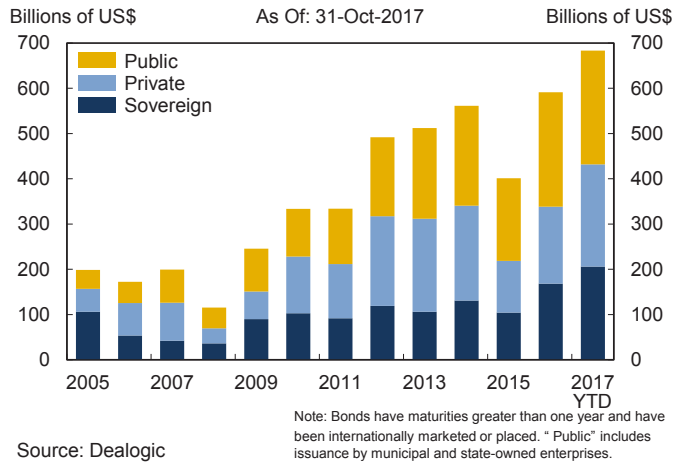
### 4.2.12 Gross Foreign Investor Capital Inflows to EMEs



Source: IMF, Haver Analytics

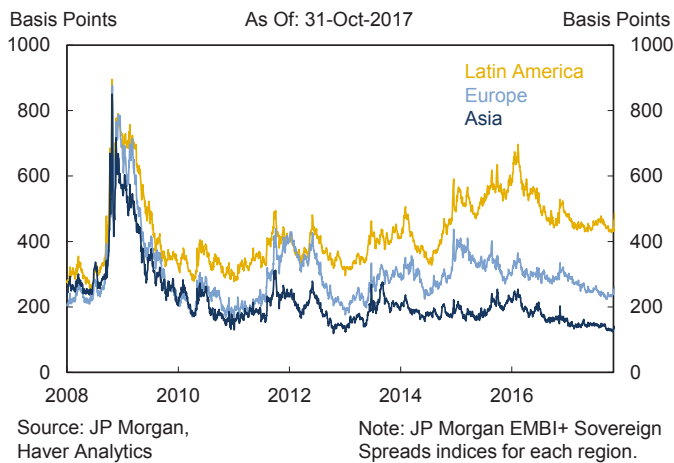


#### 4.2.13 Emerging Market Gross Global Bond Issuance



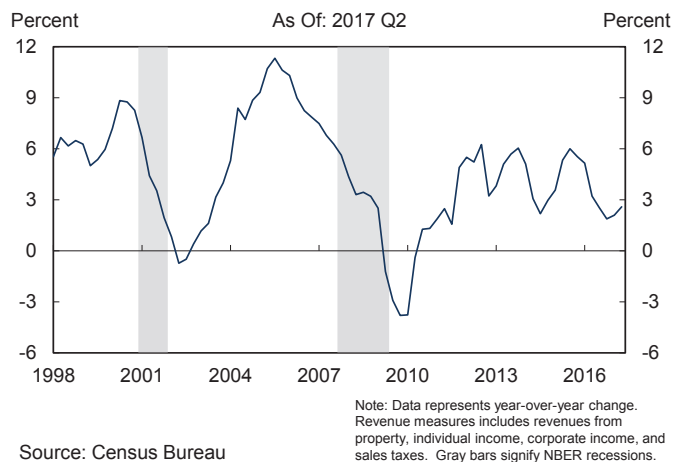
Source: Dealogic

#### 4.2.14 Emerging Market Bond Spreads



Source: JP Morgan, Haver Analytics

#### 4.2.15 Change in State and Local Government Tax Revenues



Source: Census Bureau

#### 4.2.3 U.S. Municipal Markets

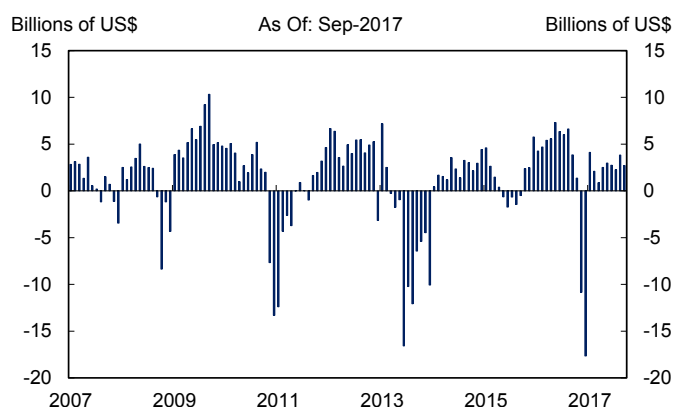
Total state and local government revenues increased 2.6 percent from the previous year as of mid-2017 (Chart 4.2.15). Overall, municipal bond ratings improved in 2016, with upgrades exceeding downgrades. In general, pricing of municipal bonds remained stable. Municipal analysts expect continued stability in the state and local sector throughout 2017.

While current budget balances reflect the prevalence of stable conditions, unfunded public pension obligations and healthcare benefit liabilities raise the risk of long-term fiscal imbalances for many state and local governments. Recent changes in accounting standards require that pension and retiree healthcare liabilities be reported on the balance sheets of state and local government entities. Bond ratings now also incorporate long-term risks, with rating agencies updating methodologies to better reflect the difficult political and economic dynamics of funding public pension liabilities.

The fiscal crisis of Puerto Rico is distinctive in a sector with few defaults. The long-developing problems on the island came to a head in 2016 with the default on many of the government's obligations. The Puerto Rico Oversight, Management, and Economic Stability Act (PROMESA), enacted in June 2016, established a fiscal oversight board and restructuring authority for Puerto Rico's roughly \$70 billion in debt. The oversight board estimates the 10-year budget gap at \$67 billion, which poses a daunting challenge to the new governor's administration. The effects of Hurricane Maria have placed further strain on Puerto Rico's fiscal situation. However, these issues have not affected the broader municipal bond market.

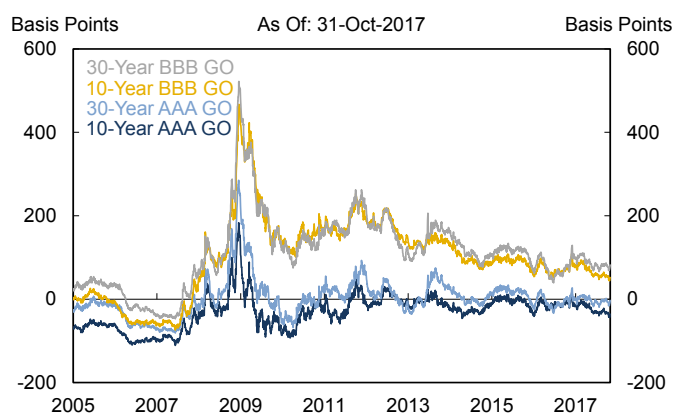
In the broader market, net flows for municipal bond funds remained positive in 2016 until November, with a shift to negative flows attributed to changing interest rate expectations and uncertainty about potential changes in federal income tax policy (Chart 4.2.16). Net flows returned to positive levels in 2017. Yield spreads for tax-exempt general obligation bonds fluctuated within a narrow range during the 2016 and 2017 (Chart 4.2.17). Total municipal bond issuance of \$446 billion in 2016 was the largest ever, with issuers acting prior to anticipated interest rate increases. As of October 2017, year-to-date issuance remains strong but is down from issuance over the same period in 2016. As in 2014 and 2015, refundings outpaced issuances of new capital (Chart 4.2.18). Demand for the low-default tax-exempt municipal bonds continues to be fueled by the aging of the retail investing population.

#### 4.2.16 Long-Term Mutual Fund Flows: Municipal Bonds



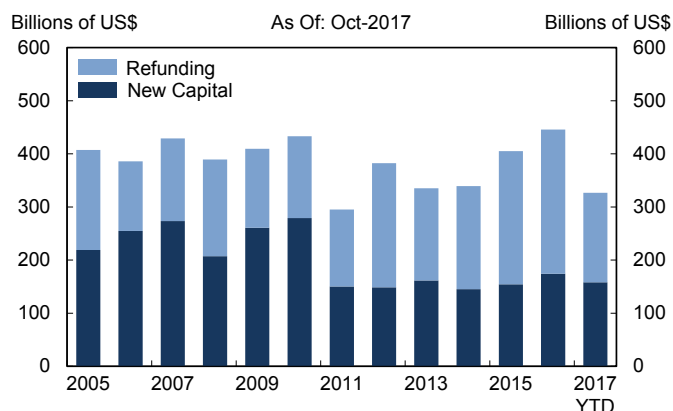
Source: ICI, Haver Analytics

#### 4.2.17 Municipal Bond Spreads



Source: Thomson Reuters MMD, Haver Analytics Note: Spreads between municipal and Treasury securities of comparable maturities.

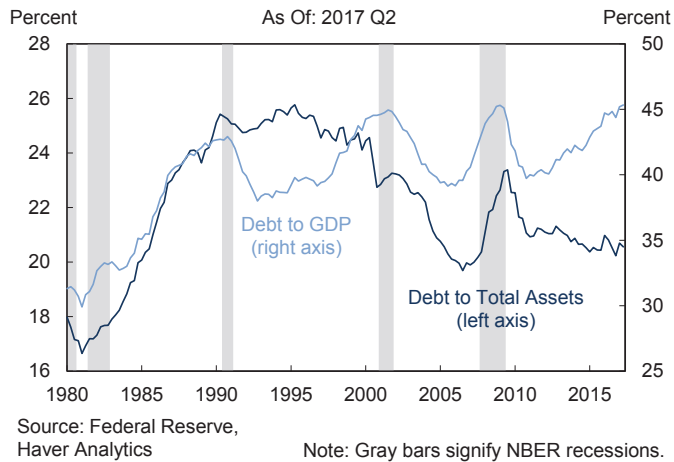
#### 4.2.18 Municipal Bond Issuance



Source: Thomson Reuters, SIFMA Note: Excludes maturities of 13 months or less and private placements.

## 4.3 Corporate Credit

### 4.3.1 Debt Ratios for Nonfinancial Corporations



### Corporate Lending

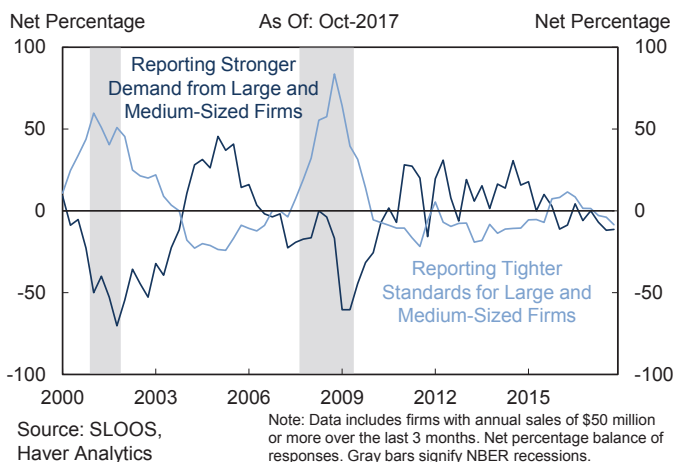
While some indicators of the health of corporate balance sheets point to rising concerns in the sector, other indicators suggest that firms are well positioned to absorb shocks. Corporate debt growth continues to outpace nominal GDP growth, pushing the ratio of corporate debt to GDP further above its historical average (**Chart 4.3.1**).

Corporate balance sheets were also supported in 2016 and 2017 by an improvement in earnings, which allowed firms to bolster their cash holdings and increase their ratio of cash to assets slightly (**Chart 4.3.2**). On balance, total outstanding bank and nonbank loans to corporations grew throughout 2016 and 2017. In 2016, commercial and industrial (C&I) bank loans grew by 7.3 percent but have remained roughly flat in 2017. Throughout most of 2016 and 2017, some respondents to the Federal Reserve's Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS) reported experiencing weaker demand for C&I loans by firms, although a majority of respondents reported no change. Of those reporting weaker demand, common explanations included decreased customer investment in plant or equipment; decreased needs for merger or acquisition financings; and greater competition from nonbank lending sources. According to the SLOOS, banks on average tightened underwriting standards slightly during 2016 and kept them generally unchanged in 2017 (**Chart 4.3.3**).

### 4.3.2 Liquid Assets to Assets for Nonfinancial Corporations



### 4.3.3 Bank Business Lending Standards and Demand



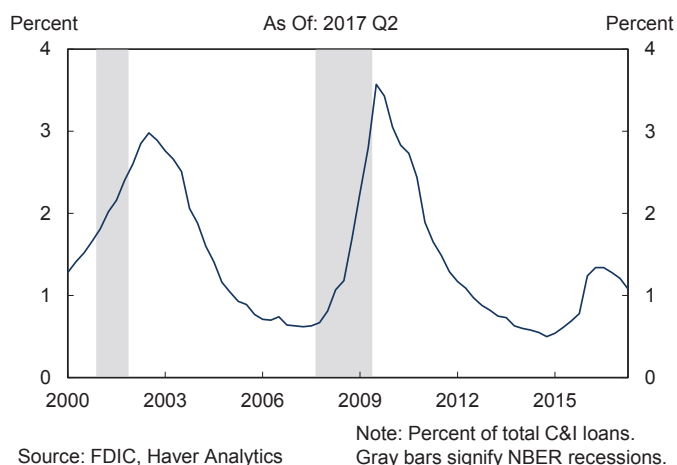
Both the delinquency rate on C&I loans and the rolling 12-month default rate on speculative grade loans steadily increased during the first half of 2016 before declining in late 2016 and the first half of 2017 (**Charts 4.3.4, 4.3.5**). The rise in the delinquency and default rates were driven primarily by distress in the energy and materials sectors.

## Corporate Credit Markets

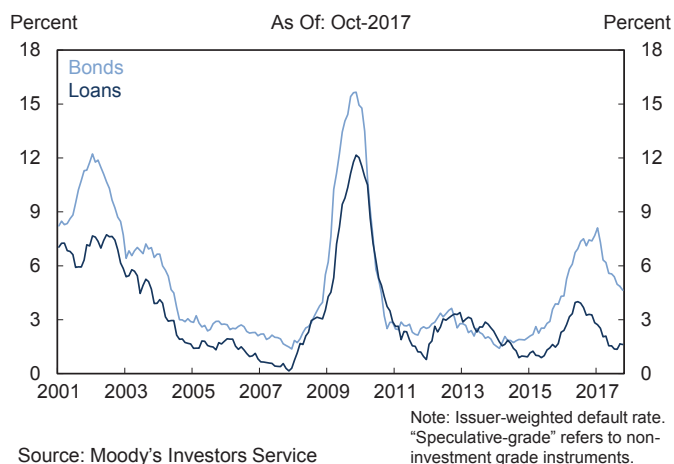
Low interest rates continued to support robust gross issuance of corporate bonds (**Chart 4.3.6**). Much of the supply of credit supported refinancing existing debt. Investment grade gross issuance reached a record high in 2016 for the fifth year in a row amid growing global demand for U.S. credit, supported in part by global central bank corporate bond buying programs. In 2017, issuance in both high-yield and investment grade bonds continued to be robust; year-to-date issuance through September 2017 slightly exceeded levels seen over the same period in 2016.

Since reaching a five-year high in mid-February 2016, credit spreads have steadily fallen (**Chart 4.3.7**). In October 2017, investment grade spreads reached their tightest level in over a decade, while high-yield spreads declined to their tightest level since mid-2014 and remained well below their long-term median.

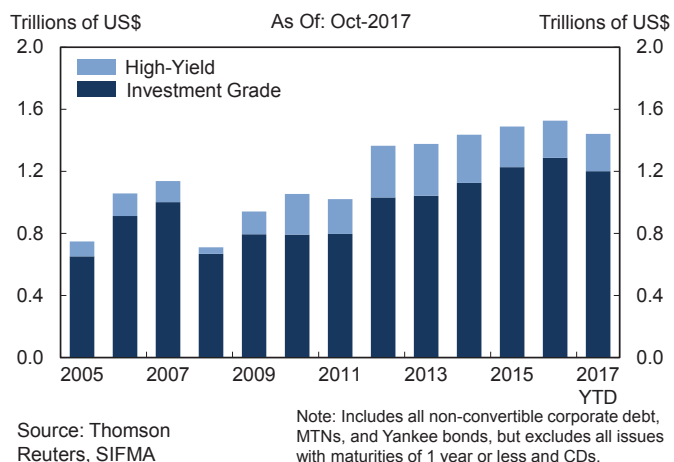
### 4.3.4 Noncurrent Commercial and Industrial Loans



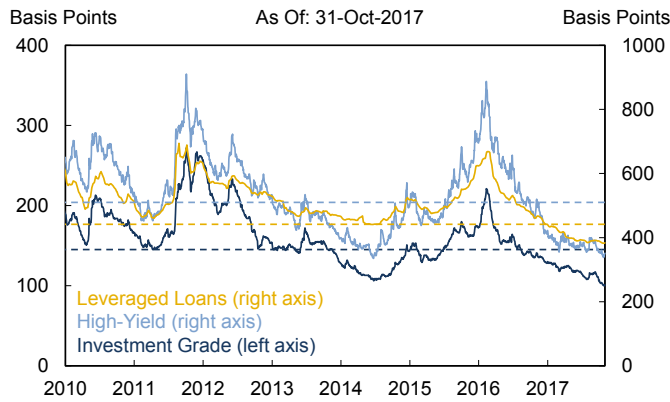
### 4.3.5 Rolling 12-Month Speculative-Grade Default Rate



### 4.3.6 Corporate Bond Issuance

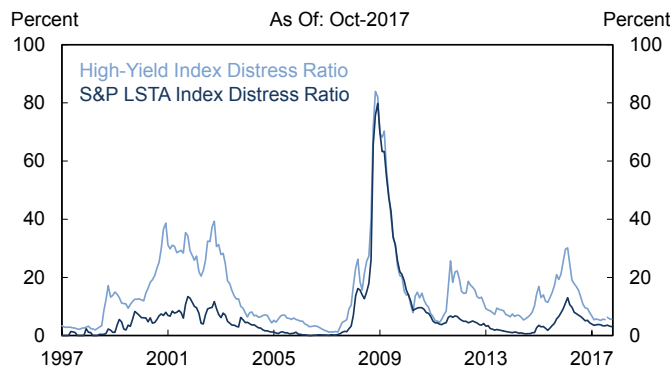


### 4.3.7 U.S. Cash Corporate Credit Spreads



Although default rates on high-yield bonds rose significantly throughout 2016, the majority of defaults were concentrated in the energy and materials sectors. Defaults on high-yield bonds decreased in 2017 as performance in these distressed sectors improved. Despite the significant increase in default rates throughout 2016, the amount of high-yield bonds and leveraged loans trading at distressed levels has fallen significantly since March 2016 (**Chart 4.3.8**).

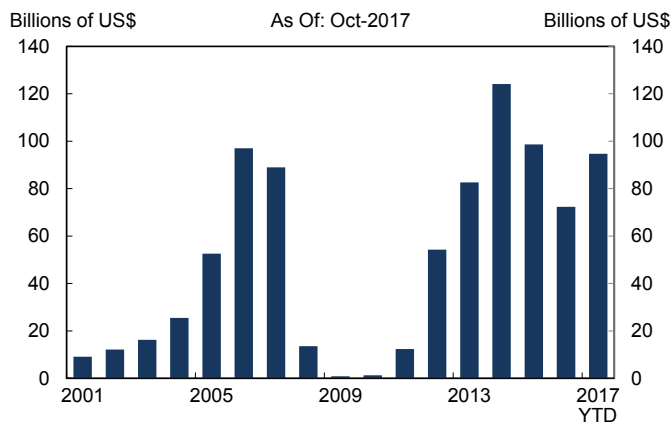
### 4.3.8 Distressed Ratios



Although issuance of collateralized loan obligations (CLOs) declined in 2016 from the highs seen in 2014 and 2015, year-to-date issuance as of the end of October 2017 has exceeded the 2016 full-year total (**Charts 4.3.9**). Issuers of CLOs remain the largest buyers of leveraged loans (**Chart 4.3.10**). In 2016, several CLO issuers began to issue risk retention-compliant deals in advance of the December 2016 implementation of risk-retention requirements.

Leveraged-loan mutual funds, which remain the second largest buyers of leveraged loans, posted their first annual inflows since 2013 as interest rates on most leveraged loans began to float, with LIBOR rising above the LIBOR floor of most loans.

### 4.3.9 CLO Issuance

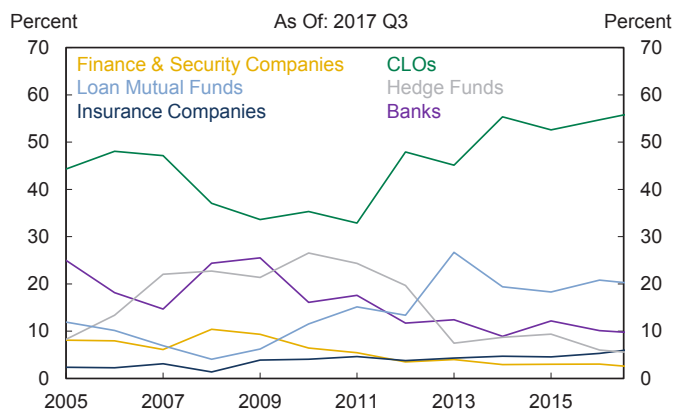


## 4.4 Household Credit

Following a sharp decline between 2008 and 2011, household debt has grown continuously but slowly since 2012, increasing 3.2 percent in 2016 and an additional 1.6 percent in the first half of 2017. Consumer credit, which accounts for approximately 30 percent of total household debt and which has driven most of the increase since 2012, increased 6.7 percent in 2016 and an additional 2.5 percent in the first half of 2017. Household debt overall continues to remain stable relative to disposable personal income, and the ratio of household debt to income remains well below the peak levels recorded in the last decade (**Chart 4.4.1**). Aggregate household net worth increased over this period, driven by rising real estate and equity prices.

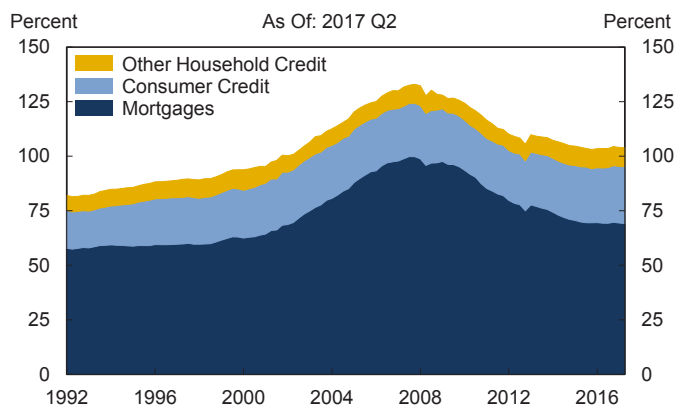
The major components of consumer credit—student loans, auto loans, and credit card debt—grew strongly in 2016 and the first half of 2017. Student loan debt, which has increased more than five-fold since 2004 due to rising education costs, an increasing number of borrowers, and slower repayment rates, now exceeds \$1.3 trillion in aggregate (**Chart 4.4.2**). Easy credit conditions and increased demand for motor vehicles spurred growth in auto loans, with originations reaching their highest level in over a decade. Credit card debt growth has accelerated from prior years, and net issuance of new cards to those with low credit scores has neared pre-crisis levels. However, new credit, as measured by increases in credit limits, continues to be extended mostly to those with relatively high credit scores.

### 4.3.10 Leveraged Loan Primary Market by Investor Type



Source: S&P LCD

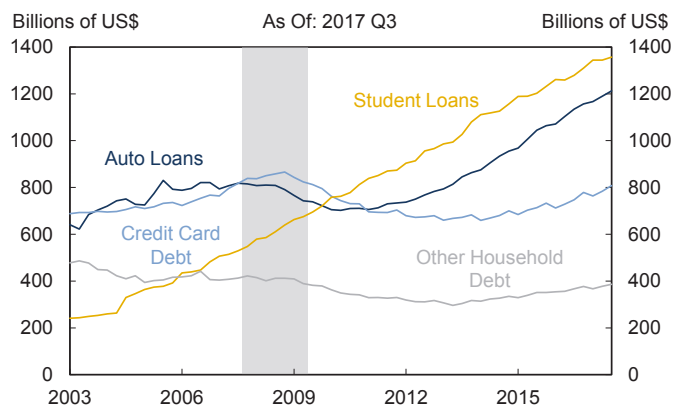
### 4.4.1 Household Debt as a Percent of Disposable Personal Income



Source: BEA, Federal Reserve, Haver Analytics

Note: Other Household Credit includes debts of both households and nonprofits.

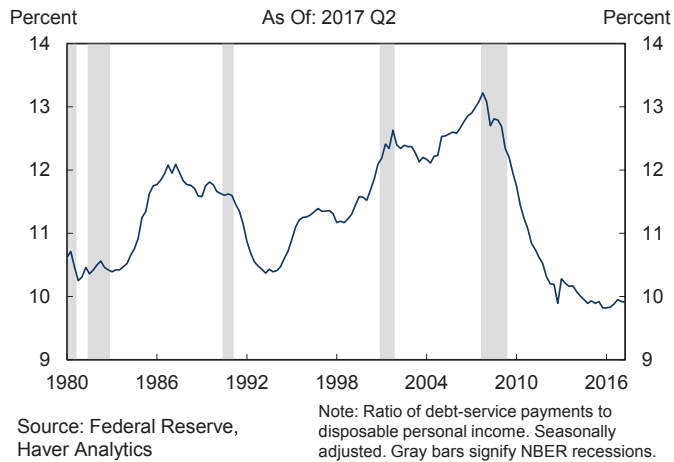
### 4.4.2 Components of Consumer Credit



Source: FRBNY Consumer Credit Panel/Equifax, Haver Analytics

Note: Gray bar signifies NBER recession.

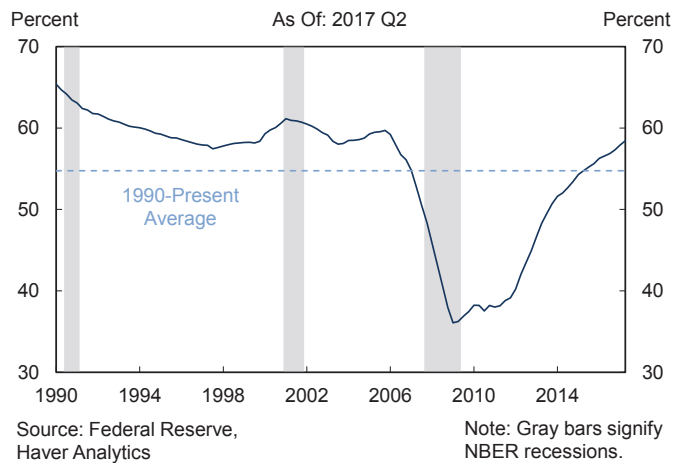
#### 4.4.3 Household Debt Service Ratio



Low interest rates helped keep the debt service ratio—the ratio of debt service payments to disposable personal income—unchanged in 2016 and the first half of 2017, near a 30-year low (**Chart 4.4.3**). Although the ratio of debt-service payments to disposable personal income for consumer credit has edged steadily upward since 2012, this trend has been fully offset by a decrease in the service ratio of mortgage debt.

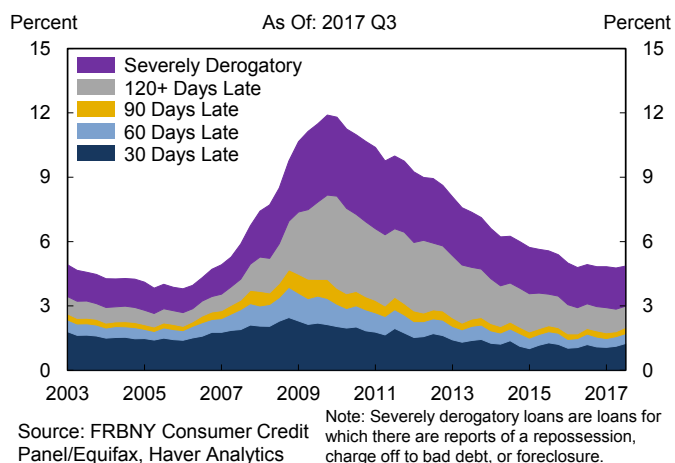
The share of owners' equity in household real estate has increased by over 20 percentage points since 2009 and is at levels that prevailed in the pre-crisis period (**Chart 4.4.4**). Rising housing prices drove a decline in the share of mortgages with negative equity and the ratio of outstanding mortgage debt to housing prices. Although home purchases continued to increase steadily, credit scores at mortgage origination remained well above historical averages. Borrowers with high or medium credit scores generally have access to mortgages backed by GSEs, while mortgage credit for households with low credit scores remained tight relative to the pre-crisis period.

#### 4.4.4 Owners' Equity as Share of Household Real Estate



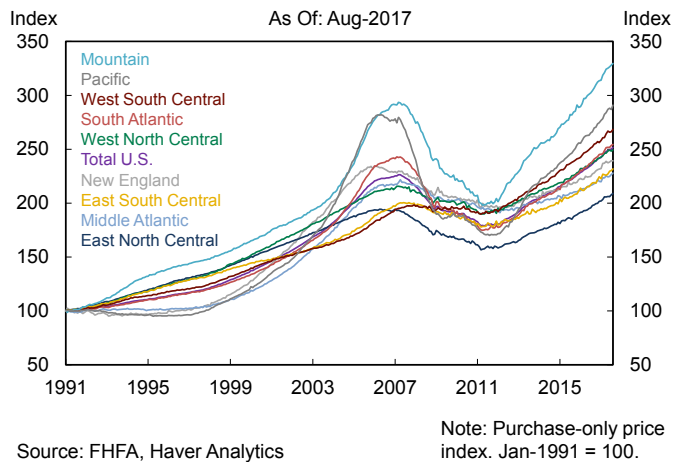
Continued decreases in delinquency rates on home equity lines of credit (HELOCs) and mortgage debt pushed household debt delinquencies to less than 5 percent, the lowest year-end level since 2006 (**Chart 4.4.5**). Decreased overall delinquency among subprime borrowers, continued write-downs of mortgage debt accumulated during the pre-crisis housing bubble, and a shift from subprime to prime mortgage balances drove the decline. The delinquency rate on student loans remained unchanged at 11 percent over the past few years after nearly doubling between 2003 and 2013. Despite elevated delinquency rates on student loans, default risk is generally limited for private lenders, since the federal government owns or guarantees most student loan debt outstanding. Signs of stress have emerged in auto lending in recent years, driven by increased subprime borrower delinquency. In the second quarter of 2017, auto loan balances that were delinquent for at least 90 days reached 3.9 percent of total auto loan balances, up from 3.3 percent three years prior. In recent quarters, credit card delinquency rates have increased slightly, and the percent of credit card loans that were delinquent for at least 90 days increased to 4.4 percent, compared to 3.7 percent three years prior. Despite this trend, the balance of credit card debt that was delinquent for at least 90 days has remained relatively stable at 7.4 percent in the second quarter of 2017, compared to 7.8 percent three years prior.

**4.4.5 Share of Household Debt by Delinquency Status**





#### 4.5.1 House Prices by Census Region



## 4.5 Real Estate Markets

### 4.5.1 Residential Housing Markets

In 2016 and the first half of 2017, house prices and home sales increased, and mortgage loan performance improved, continuing multi-year trends.

FHFA's seasonally adjusted purchase-only house price index for the United States continued to increase, and both the national index and the values for many census divisions are above their earlier peaks in 2007. The national index rose 11 percent between 2015 year-end and August 2017, with the greatest house price growth in the Mountain, Pacific, and South Atlantic census divisions (**Chart 4.5.1**). A tight supply of housing inventory has been a key factor behind the recent increase in house prices, though factors influencing demand for homes, such as a strong job market and increased consumer confidence, have also played a role.

The solid pace of job creation, high consumer confidence, and low mortgage rates also contributed to the rise in home sales in 2016 and 2017. Existing home sales increased to their highest level since 2006, and new home sales increased to their highest level since 2007. Existing home sales were roughly in line with levels that prevailed in the early 2000s, while new home sales remain depressed relative to historical averages—the 603,000 units sold over the 12 months ending October 2017 is only slightly higher than the lows of the recession in the early 1990s and is comparable to levels last seen regularly in the 1960s and 1970s. Housing starts followed a similar pattern to new home sales, generally rising in 2016 and 2017 but remaining below their long-term average. According to surveys of home builders, expansion of new home construction was hindered somewhat by land and labor constraints.

Housing affordability, as determined by several indicators such as income, house prices, and interest rates, declined in 2016 and the first three quarters of 2017 but remains well above

historical averages. The National Association of Realtors index of affordability has declined by 8 percent during 2016 and the first two quarters of 2017. While house prices have risen sharply from post-crisis lows, strong employment gains and low interest rates have partially offset the effects of these higher prices.

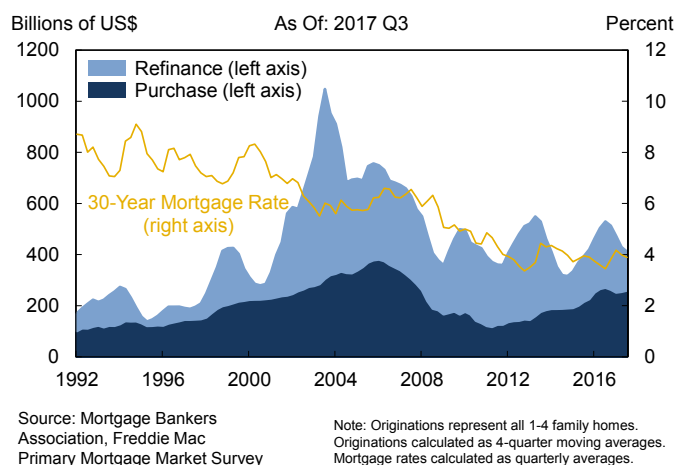
The homeownership rate dipped from 63.8 percent at year-end 2015 to 62.9 percent in mid-2016—its lowest level since 1965—before rebounding in the third and fourth quarters. The rate remained steady in 2017 ending the third quarter at 63.9 percent. With homeownership well below the highs of the mid-2000s, rental vacancy rates dropped below 7.0 percent in 2016, representing their lowest level in more than 20 years, before rising slightly in 2017, ending the third quarter at 7.5 percent.

### Mortgage Originations, Servicing, and Loan Performance

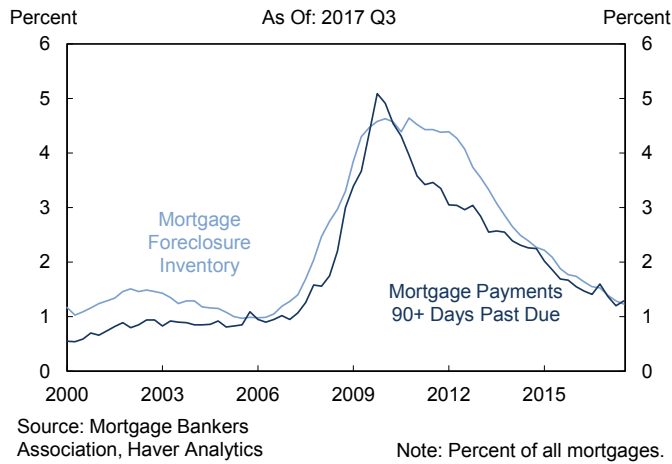
Total mortgage originations increased 22.1 percent in 2016, boosted by lower interest rates and rising home sales. Purchase originations rose by \$149 billion to \$1,052 billion, reaching their highest level since 2007, while refinance originations increased by \$223 billion to \$999 billion (**Chart 4.5.2**). Refinance origination volume was bolstered by low mortgage rates for much of 2016, with the 30-year fixed-rate mortgage rate averaging 3.65 percent for the year, compared to an average of 3.85 percent in 2015. The 30-year fixed-rate mortgage rate fell in concert with long-term Treasury yields in the first half of 2016, reaching a low of 3.41 percent in July, before rising approximately 90 basis points in the fourth quarter of 2016. Mortgage rates have generally declined over the course of 2017 as demonstrated by the Freddie Mac Primary Mortgage Market Survey for 30-year fixed rate mortgages which ended the third quarter at 3.83 percent.

Nonbanks continued to expand their share of the mortgage origination market in 2016, accounting for 51.0 percent of originations among the top 100 lenders—an increase from

### 4.5.2 Mortgage Originations and Rates



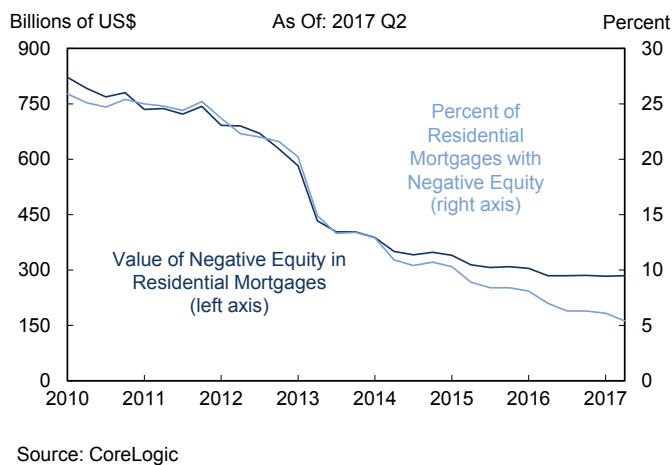
### 4.5.3 Mortgage Delinquency and Foreclosure



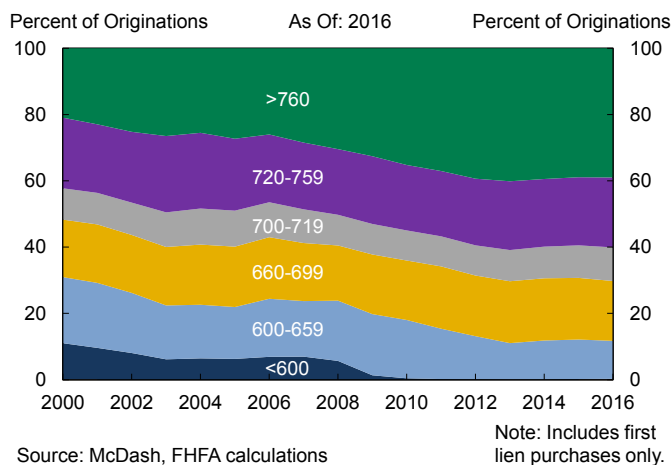
48.4 percent in 2015. Six of the ten largest lenders in 2016 were nonbanks, whereas in 2015, nonbanks comprised four of the ten largest lenders.

The performance of outstanding mortgage loans continued to improve, with delinquencies, foreclosures, and the number of households with negative equity all declining during 2016 and 2017. The number of loans in foreclosure fell to 1.5 percent of outstanding loans as of year-end 2016 from 1.8 percent as of year-end 2015, and the number of loans 90 or more days past due fell to 1.6 percent of outstanding loans from 1.7 percent over the same period (Chart 4.5.3). Foreclosures and delinquencies continued to decline in the first three quarters of 2017 as well. The average loan-to-value ratio for all outstanding mortgages in the United States fell to 55.5 percent as of year-end 2016 from 57.6 percent as of year-end 2015. The number of properties with negative equity and the amount of negative equity in residential mortgages also continued to decline in 2016. The amount of negative equity fell from \$309 billion to \$286 billion across 3.2 million properties (Chart 4.5.4). Higher house prices, completed foreclosures on underwater loans, loan modifications, and the amortization of older loans have all contributed to the steady decline in the number of loans with negative equity. However, there remains wide geographic variation in the prevalence and severity of negative equity across the country.

### 4.5.4 Mortgages with Negative Equity



### 4.5.5 Purchase Origination Volume by Credit Score

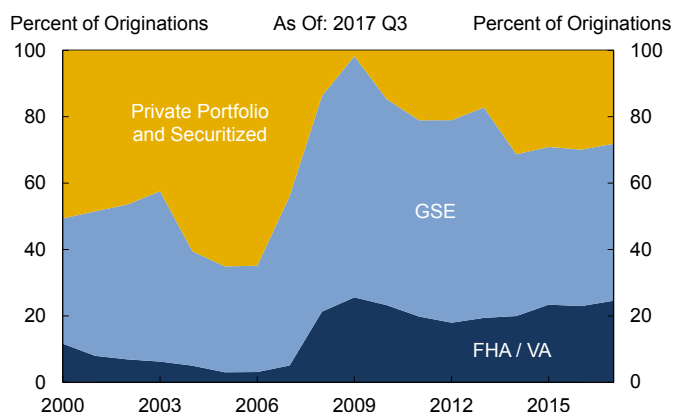


The average FICO score for new mortgages continued to increase in 2016, and remains well above the levels observed in the mid-2000s (Chart 4.5.5). Underwriting standards were little changed in 2016, with the average debt-to-income ratio and the average loan-to-value ratio very similar to 2015. Lender surveys from the Federal Reserve and bank examiner surveys from the OCC also show that lenders have remained conservative with their underwriting of mortgage credit.

The federal government continues to back the majority of new mortgages, both directly—through agencies including the Federal Housing Administration (FHA) and U.S. Department of Veterans Affairs (VA)—and indirectly through the GSEs, although the GSEs have reduced their credit exposures through risk transfer programs. The share of the market backed by the federal government directly and by the GSEs has stabilized at approximately 70 percent of total originations, after shrinking from 2009 through 2014 (Chart 4.5.6). New mortgages not securitized by Ginnie Mae or the GSEs continue to be held in lender portfolios instead of being securitized in the private-label market. Ginnie Mae, Fannie Mae, and Freddie Mac backed nearly all residential mortgage-backed security (RMBS) issuance in 2016. Agency RMBS issuance was \$1.6 trillion in 2016, compared to \$86 billion of non-agency RMBS issuance (Chart 4.5.7). Non-agency RMBS issuance declined from \$97 billion in 2015 but remained higher than in any other year since 2007.

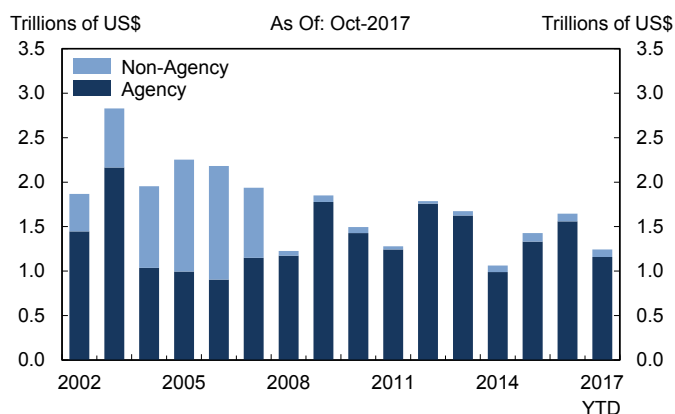
Nonbank firms continued to purchase mortgage servicing rights (MSRs) from banks and thrifts in 2016. Among the 25 largest servicers, nonbanks accounted for nearly 38 percent of servicing volume as of the third quarter of 2017, up from 32 percent at year-end 2015 (Chart 4.5.8). Nonbank servicers have primarily purchased MSRs from larger banks, as the share of servicing volume held by smaller banks rose in 2016 alongside that of nonbanks. While nonbanks have broadly increased their share of the mortgage servicing market, they have become especially dominant in the servicing of Ginnie Mae mortgages, for which they service more than half of outstanding loans. Nonbank servicers have also increased their market share among GSE loans, servicing 36 percent of Fannie Mae loans and 29 percent of Freddie Mac loans as of September. The growth of nonbank servicers highlights the importance of risk management procedures and compliance with regulatory standards among these firms. In particular, large and growing MSR portfolios can entail significant

#### 4.5.6 Mortgage Originations by Product



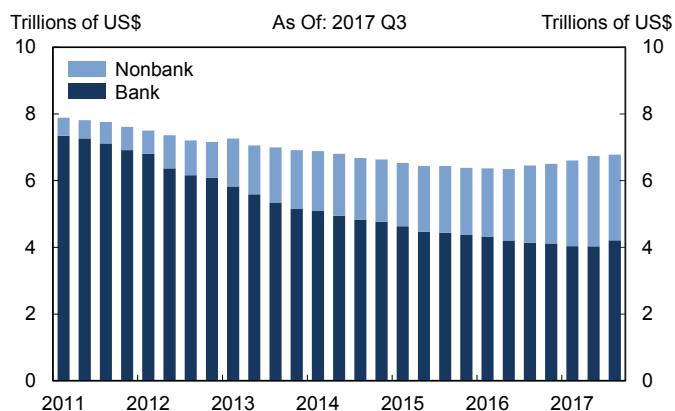
Source: Inside Mortgage Finance

#### 4.5.7 RMBS Issuance



Source: Fannie Mae, Freddie Mac, Ginnie Mae, Bloomberg, L.P., Thomson Reuters, SIFMA

#### 4.5.8 Mortgage Servicing Market



Source: Inside Mortgage Finance

Note: Data covers top 25 servicers in each quarter.

interest rate risk, which requires careful and prudent risk management over long periods of time. Consequently, the GSEs, Ginnie Mae, and the CFPB have issued new requirements for nonbank servicers to mitigate some of these risks.

#### **4.5.2 Government-Sponsored Enterprises**

Fannie Mae and Freddie Mac continued to reduce the mortgage credit risk borne by taxpayers and expand the role of private capital in the mortgage market via their credit risk transfer transactions. Through the issuance of Fannie Mae's Connecticut Avenue Securities (CAS) and Credit Insurance Risk Transfer (CIRT) transactions, in 2016, the company transferred a portion of the mortgage credit risk on single-family mortgages with an unpaid principal balance (UPB) of over \$330 billion at the time of the transactions. Cumulatively, \$648 billion in UPB of the company's single-family loans were covered by a credit risk transfer transaction as of year-end 2016, primarily through CAS and CIRT transactions. By June 2017, \$798 billion in UPB has been transferred.

Freddie Mac transferred a portion of the mezzanine credit risk on approximately \$215 billion in UPB of single-family mortgage loans in 2016, primarily through its issuance of Structured Agency Credit Risk (STACR) securities and through its Agency Credit Insurance Structure (ACIS) transactions. In the first half of 2017, Freddie Mac transferred credit risks on an additional \$170 billion in UPB. Since it began undertaking credit risk transfers, as of the second quarter of 2017, Freddie Mac has executed transactions covering \$771 billion in UPB. Additionally, both enterprises launched vehicles in 2016 to transfer mezzanine credit risk to reinsurer affiliates of mortgage insurance companies. These vehicles provide coverage on a "flow" basis, meaning the risk transfer will have been committed prior to the enterprises' acquisition of the covered loans and that the insurance coverage will be effective as soon as the loans are acquired. Both enterprises conducted additional transactions in 2017.

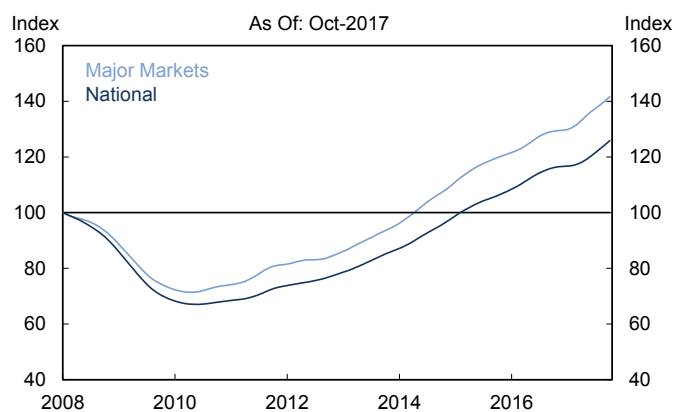
A wide array of institutional investors have purchased mortgage credit risk from the GSEs, with over 150 investors participating in the CAS and STACR programs. Roughly half of the mortgage credit risk transferred through these programs has been purchased by asset managers, while hedge funds have purchased another third of the total. The GSEs have sold the remainder to a mix of banks, insurance companies, real estate investment trusts (REITs), and sovereign wealth funds.

### 4.5.3 Commercial Real Estate

CRE property prices increased in 2016, with multifamily properties outpacing the other CRE sectors. In 2016, the national CRE property price index grew 8.4 percent, and in the first ten months of 2017 the index grew another 7.9 percent (**Chart 4.5.9**). Prices on multifamily properties have grown much faster than the national average, as have prices on commercial properties in major markets. **Box B** provides a further discussion of valuations in CRE.

Outstanding CRE loans, including multifamily residential loans, grew 6.5 percent in 2016 and have continued to grow in 2017 reaching \$3.7 trillion, an increase of 2.7 percent from year end 2016. As a ratio to GDP, CRE loans increased to 19 percent in the second quarter of 2017 from 18 percent in 2015, but the ratio is still lower than the peak level of 23 percent in 2008. Notably, banks and life insurance companies continued to expand CRE loan portfolios. CRE loans outstanding at U.S. banks and life insurers reached \$2.0 trillion and \$448 billion in the second quarter of 2017, respectively, an increase of 8 percent and 10 percent since the prior year (**Chart 4.5.10**). While loans held in commercial mortgage-backed securities (CMBS) and REITs have fallen over the past few years, four quarter CMBS issuance grew 19 percent from the third quarter 2016 and is on track to well exceed total 2016 volume, driven mostly by single-borrower issues.

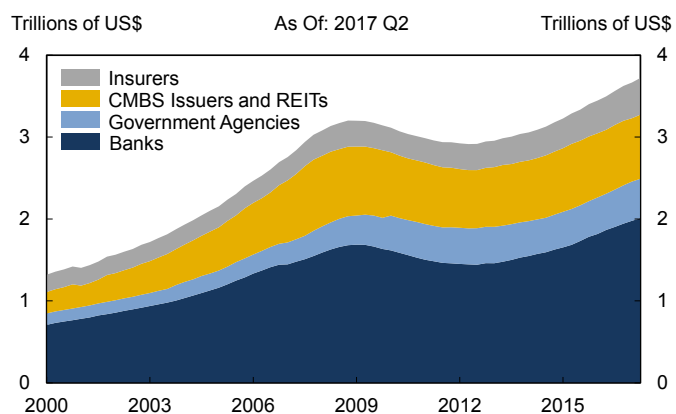
### 4.5.9 Commercial Property Price Indices



Source: Real Capital Analytics

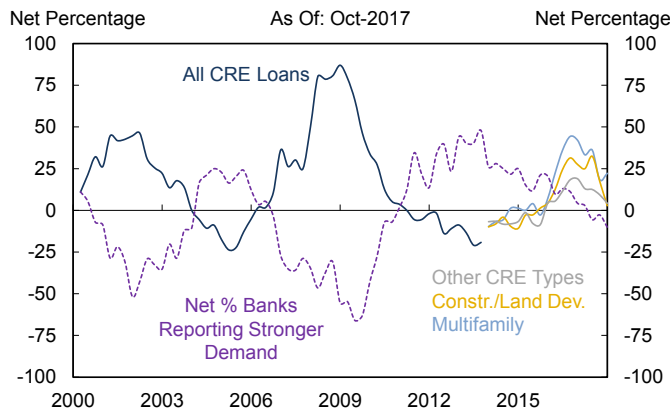
Note: Jan-2008 = 100.

### 4.5.10 CRE Loans by Institution



Source: Federal Reserve, Haver Analytics

#### 4.5.11 Percent of Banks Tightening Loan Standards

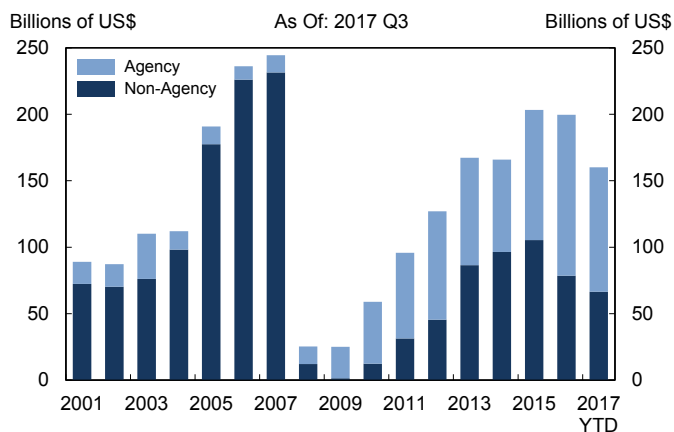


Source: Federal Reserve, Haver Analytics

Despite reporting general increases in demand for CRE loans over the past two years, the Federal Reserve's SLOOS also showed that banks have reported tightened lending standards since 2015 as a result of concerns about the near-term fundamental outlook and a reduced tolerance for risk (Chart 4.5.11). In particular, a significant number of banks reported tightening of standards for multifamily loans.

CRE delinquency rates generally remained stable or improved slightly in 2016, with the most notable improvement reflected in the delinquency rate of the CRE loans held by commercial banks. Between the fourth quarter of 2016 and the second quarter of 2017, the delinquency rate fell steadily from 1.1 percent to 0.8 percent, and the CRE charge-off rate declined to near-zero. Delinquency rates on commercial mortgage-backed securities, an exception to this improving trend, rose in 2016 and into 2017. The increase is primarily the result of the higher balance of maturing loans originated in 2006 now failing to refinance, as underwriting conditions were much looser than today. Preliminary data for the third quarter of 2017 indicate that delinquency rates are improving marginally.

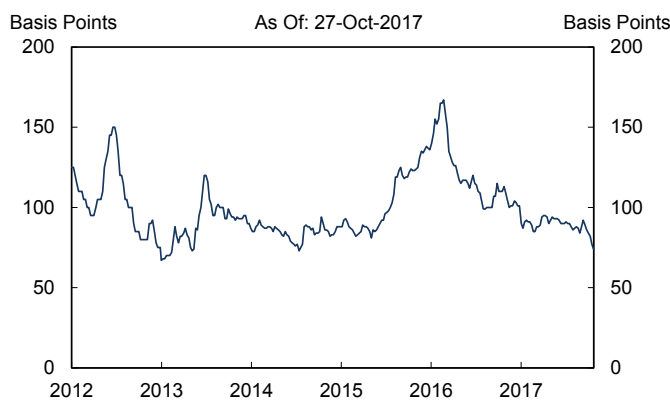
#### 4.5.12 CMBS Issuance



Source: Inside Mortgage Finance

Non-agency CMBS in 2016 reversed the multi-year trend of increasing issuance, falling 25.5 percent year-over-year. However, agency issuance of CMBS that finance multifamily loans rose 23.7 percent during the same period, accounting for over 60 percent of total CMBS issuance (Chart 4.5.12). A notable change in the CMBS market occurred on December 24, 2016 when CMBS issuers began to comply with a risk retention rule that requires securitizers to retain credit risk of the transactions they sponsor.

#### 4.5.13 CMBS Senior Debt Spreads



Source: J.P. Morgan

Note: Spreads are 10-year Swaps to Senior AAA CMBS.

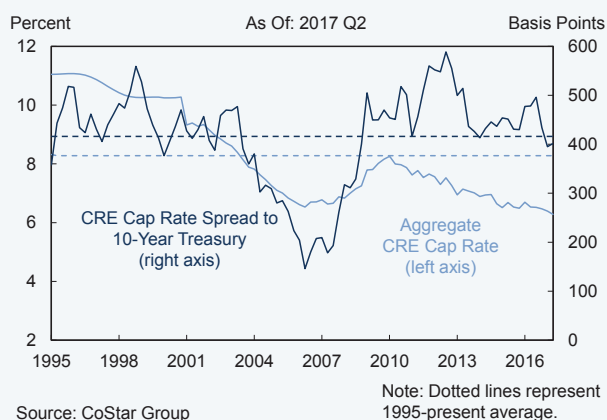
After experiencing significant market volatility in the first quarter of 2016, CMBS spreads tightened as the broader credit market stabilized and CMBS issuance resumed (Chart 4.5.13).

## Box B: Valuations in Commercial Real Estate Markets

In an environment of rising but still low yields, as is highlighted elsewhere in this report, financial market participants may be tempted to engage in greater risk-taking (see Section 6.4). Such behavior may manifest itself as rapid growth in asset prices or outstandings. The Council's 2016 annual report noted that CRE prices had continued to climb and that capitalization rates had fallen. Since then, prices have risen further, capitalization rates have remained at historically low levels, and growth in commercial bank CRE lending has been robust.

Price growth in all major categories of CRE has been rapid since the sharp declines posted during the financial crisis. One way of evaluating the extent to which prices are in line with fundamentals is to examine the capitalization rate (or “cap rate”)—the ratio of the CRE property’s net operating income divided by its current market value. This measure may be thought of as a CRE analogue to an inverse price-to-earnings (P/E) ratio; thus, a low cap rate could be indicative of stretched valuations in the industry. Cap rates have fallen in recent years and are currently at a low level (Chart B.1).

### B.1 CRE Capitalization Rates and Spreads



Growth of CRE loans has also been robust in the recovery from the financial crisis, and has been particularly strong at commercial banks and insurance companies over the past two years. While CRE prices are not being fully supported by property level income growth, there are also concerns about inappropriate risk pricing or underwriting standards and the extent to which such lending is concentrated among particular institutions.

CRE holdings at U.S. banks with less than \$50 billion in assets grew faster than these banks’ holdings of other asset classes in 2016, resulting in higher concentrations of CRE assets than in 2015. Higher underlying valuations may leave such banks particularly vulnerable to the consequences of CRE price declines.

Results from the most recent Federal Reserve SLOOS indicated that commercial banks have reported tightened standards on all three major categories of CRE lending (see Section 4.5.3). Responses to the July 2016 SLOOS survey also indicated that the current levels of standards on all major categories of such loans are tighter than the midpoints of the ranges that have prevailed since 2005. Furthermore, bank examiners surveyed for the OCC’s 2016 Survey of Credit Underwriting Practices indicated that although they considered the magnitude of growth in CRE products to be an important credit-related issue, excessive credit risk is a concern in only a small number of banks.

Loan levels relative to GDP for nonfarm nonresidential properties and multifamily properties have been rising, but remain below pre-crisis levels for construction and land development loans (Chart B.2).

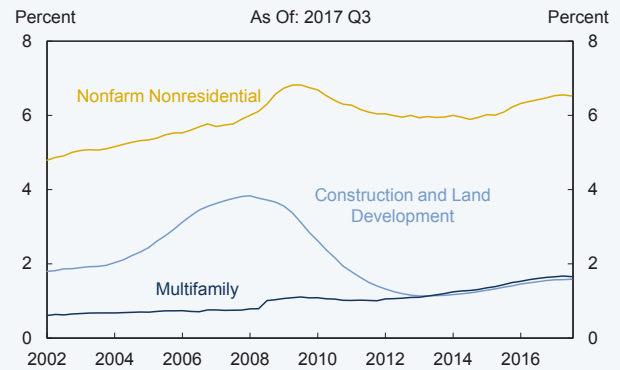
Retail commercial property type continues to be in focus as more shoppers purchase goods online and retailers with brick-and-mortar stores reduce physical footprint. In particular, regional malls may be



problematic for investors if default rates begin to rise coupled with the larger losses given default. Moody's has noted that the liquidated loans on 30 malls that have defaulted since 2008 lost 75 percent of their principal on average, in contrast to the 45 percent average for all CMBS loans liquidated over the same period. Since 2016 there has been an uptick in the percentage of retail loans that have defaulted on payment or were sent to special servicing.

Hence, CMBS delinquency rates could increase as the CMBS maturities occur. Indeed, the CMBS delinquency rate rose to 5.44 percent in August 2017, up from 4.68 percent a year earlier. This increase was driven largely by loans that were originated pre-crisis.

### B.2 CRE Loan Levels to GDP



Source: FDIC, BEA, Haver Analytics  
 Note: Loans held at FDIC-insured commercial banks.

## 4.6 Foreign Exchange

Despite depreciating in 2017, the dollar remains stronger, on a trade weighted basis, than its longer-term historical average (**Chart 4.6.1**). The dollar appreciated sharply in late 2014 and early 2015 amidst diminishing monetary accommodation in the United States relative to other major economies and increased concerns about the global growth outlook. The dollar exhibited broader stability against many currencies over the first three quarters of 2016, with notable exceptions of the Japanese yen and British pound. The dollar rallied against most currencies in the final two months of 2016, supported by increased expectations for stronger U.S. growth (**Chart 4.6.2**). The dollar depreciated broadly over the first three quarters of 2017 as foreign growth accelerated and the pace of U.S. monetary normalization remained gradual.

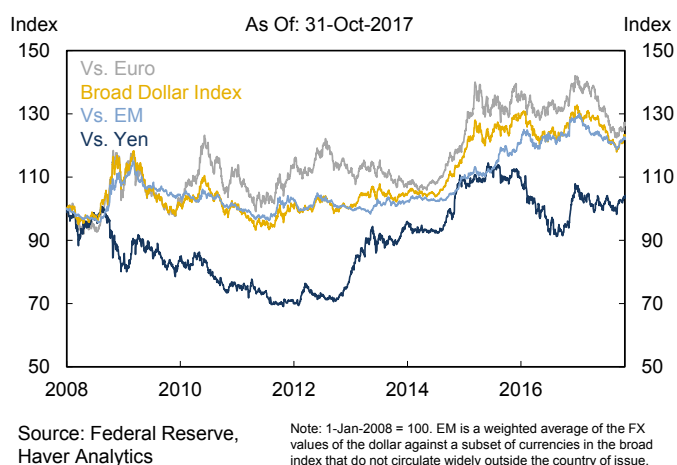
The Japanese yen appreciated relative to the dollar over the first half of 2016, bolstered by safe haven inflows and repatriation of overseas retained earnings. This movement against the dollar largely retraced in the second half of 2016, particularly after the U.S. presidential election and accompanying shift in expectations concerning the U.S. growth outlook. Over the first three quarters of 2017, the yen appreciated modestly against the dollar.

The British pound experienced high volatility in 2016, particularly after the UK referendum on EU membership in June. The pound fell 8 percent against the dollar on the day following the referendum and 11 percent intraday, the largest such declines in the currency on record (dating to 1971). Over the remainder of 2016, the pound declined by an additional 9.5 percent against the dollar. The pound experienced particularly sharp depreciation on October 7, falling as much as 9 percent intraday, likely driven by a variety of factors including high demand for hedging and limited liquidity. Coordinated G-7 public communication immediately following the UK referendum outcome supported investor sentiment, as did

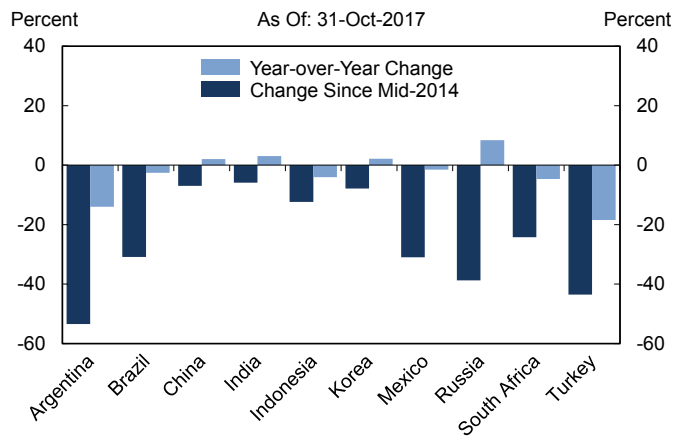
### 4.6.1 Nominal U.S. Dollar Trade-Weighted Index



### 4.6.2 U.S. Dollar Performance



### 4.6.3 Change in U.S. Dollar Exchange Rates



Source: Wall Street Journal, Haver Analytics

accommodative monetary and fiscal policy responses by the UK authorities. The pound partially rebounded in 2017 as near-term growth proved more resilient than expected, and more recently, expectations shifted towards higher interest rates.

After facing considerable downward pressure in late 2014 and in 2015, emerging market currencies experienced divergent performance against the dollar in 2016 (**Chart 4.6.3**). In particular, the Mexican peso and Turkish lira continued to weaken, although the peso retraced the majority of its 2016 losses against the dollar over the first half of 2017. Emerging market currencies generally appreciated in 2017 on improved growth prospects in EMEs over the period.

## 4.7 Equities

Developed and emerging market equities saw generally strong performances in 2016 and the first ten months of 2017 (**Chart 4.7.1**). Equity prices in the United States and other major developed countries generally fell over the first few months of 2016 but have rebounded steadily over the past year and a half. The increase in equity prices over the past year may reflect expectations for expansionary U.S. fiscal policies, along with stronger economic data and earnings growth in both emerging market and advanced economies. The S&P 500 index's composite trailing P/E and P/B ratios rose above their 20-year averages in 2016 and remained elevated in 2017 (**Chart 4.7.2**). Analysis by the International Monetary Fund (IMF) suggests that over 2016, U.S. equity valuations received increasing support from low yields and a narrowing equity premium.

Although equity price gains were widespread over 2016 and 2017, there were some notable differences in performance between sectors. The technology sector was the top performer over 2016 and 2017, supported by strong corporate earnings. Additionally, the financial and industrial sectors outperformed the market in months following the U.S. presidential election, with financials benefiting from a steeper yield curve, and industrials benefiting from the prospect of new infrastructure spending. While the energy sector has recovered from its January 2016 lows, the sector continues to underperform in 2017, as oil and natural gas prices remain range bound.

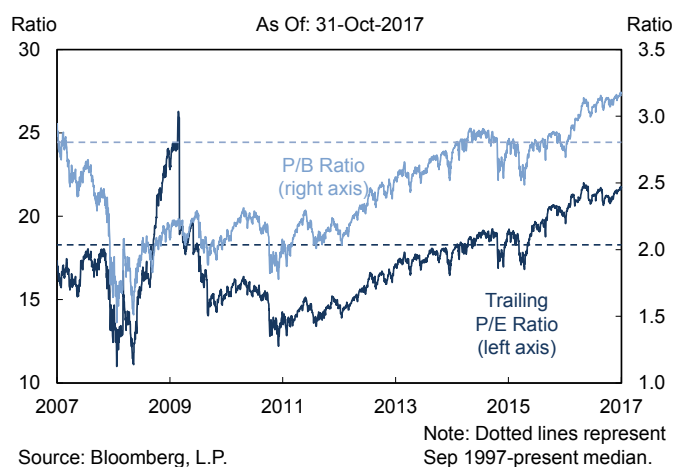
U.S. equity market implied volatility, as measured by the Chicago Board Options Exchange Volatility Index (VIX) averaged 15.8 over 2016 and 11.2 in the first ten months of 2017, well below its twenty year historical average (**Chart 4.7.3**). The VIX peaked at 28.1 in February 2016 and spiked again around the June 2016 UK referendum to leave the EU and the November 2016 U.S. presidential election. Market volatility declined relatively quickly after these events, and on November 3, 2017, the VIX closed at a record low.

### 4.7.1 Returns in Selected Equities Indices

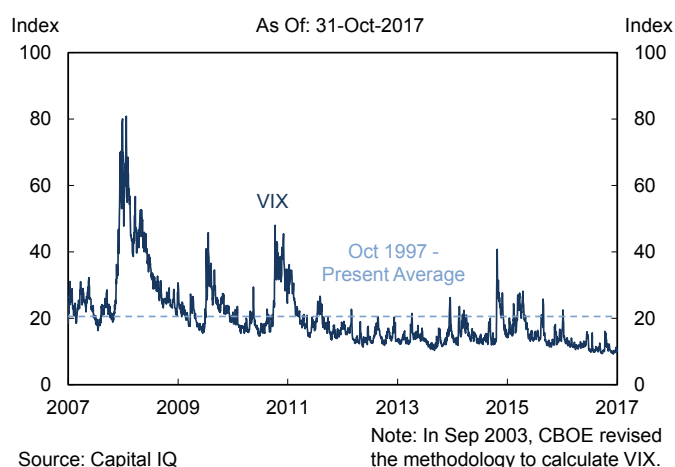
	Change from 31-Oct-2016 to 31-Oct-2017	Annual growth rate from 31-Oct-2012 to 31-Oct-2017
<b>Major Economies</b>		
U.S. (S&P)	21.1%	12.8%
Euro (Euro Stoxx)	20.9%	9.9%
Japan (Nikkei)	26.3%	19.8%
U.K. (FTSE)	7.7%	5.3%
<b>Selected Europe</b>		
Germany (DAX)	24.0%	12.7%
France (CAC)	22.0%	9.9%
Italy (FTSE MIB)	33.1%	8.0%
Spain (IBEX)	15.1%	6.1%
<b>Emerging Markets</b>		
MSCI Emerging Market Index	23.3%	2.3%
Brazil (Bovespa)	14.5%	5.4%
Russia (MICEX)	3.8%	7.7%
India (Sensex)	18.9%	12.4%
China (Shanghai SE)	9.4%	10.4%
Hong Kong (Hang Seng)	23.2%	5.5%
South Korea (KOSPI)	25.7%	5.7%

Source: Capital IQ

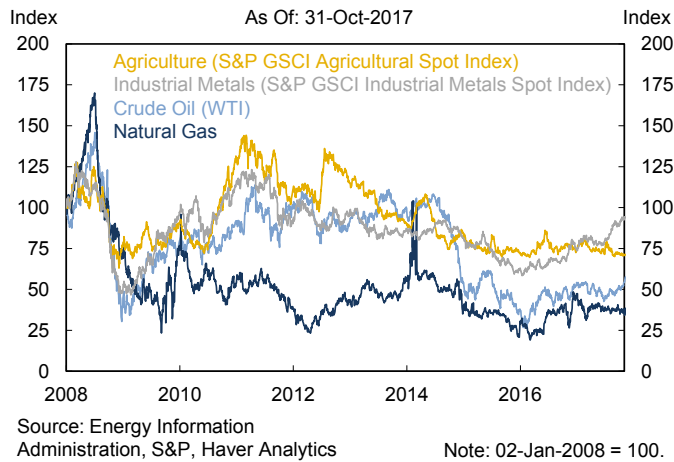
### 4.7.2 S&P 500 Key Ratios



### 4.7.3 S&P 500 Volatility



### 4.8.1 Commodities



## 4.8 Commodities

Commodity prices generally rebounded, on net, in 2016, from the declines posted in the preceding year (**Chart 4.8.1**). The overall S&P GSCI Spot Index increased 27.8 percent in 2016, largely reflecting a 45.0 percent increase in oil prices (which have a majority weight in the index). Commodity prices have been largely flat in 2017, with the overall S&P GSCI Spot Index up 4.3 percent year-to-date as of October 31, 2017.

Early in 2016, the continued fall in oil and natural gas prices had called into question the debt repayment capacity of highly-leveraged energy-related companies, specifically in the upstream exploration and production subsector. Oil prices began to rise late in the first quarter of 2016, against the backdrop of slowing U.S. domestic production, public comments by officials from the Organization of Petroleum Exporting Countries (OPEC) pointing to possible tightening in supply, and improved oil demand outlook.

OPEC and major non-OPEC oil producing nations entered into a production limiting agreement in November 2016, which has put an implicit floor under global benchmark oil prices. In May 2017, OPEC and major non-OPEC oil producing nations agreed to extend production cuts through March 2018, and West Texas Intermediate (WTI) crude oil prices have remained between \$40 and \$60 per barrel in the first ten months of 2017.

Prices of industrial metals rose in 2016 and 2017, with the S&P GSCI Industrial Metals Index climbing 18.9 percent in 2016, and an additional 25.0 percent year-to-date through October 31, 2017. The recent increase is likely due in part to stronger than expected global growth, but also due to prospective supply cuts in some metals. Anti-dumping restrictions may have led to increases in some metal prices, and copper prices were affected by disruptions to mining, rising over 13.3 percent in the fourth quarter of 2016. Meanwhile, agricultural

commodities have been flat in 2016 and 2017 as the effects of El Niño led to a shift in seasonal supplies. The S&P GSCI Agriculture Index peaked in June 2016, with a 23.8 percent rally, but ended 2016 just 2.6 percent higher, and is down 4.9 percent year-to-date as of October 31, 2017.

## 4.9 Wholesale Funding Markets

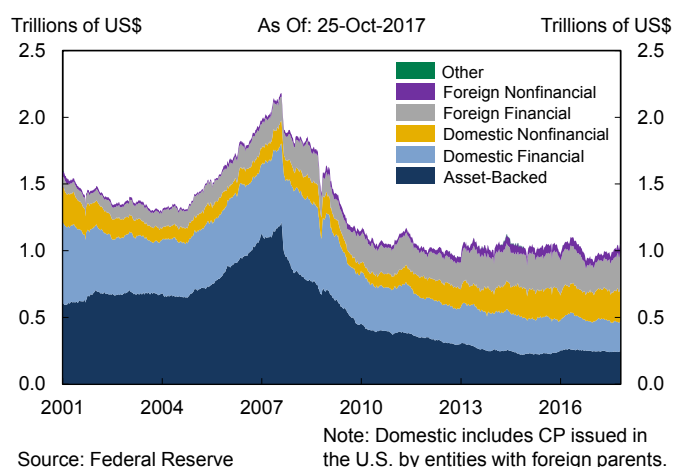
### 4.9.1 Unsecured Borrowing

#### Commercial Paper

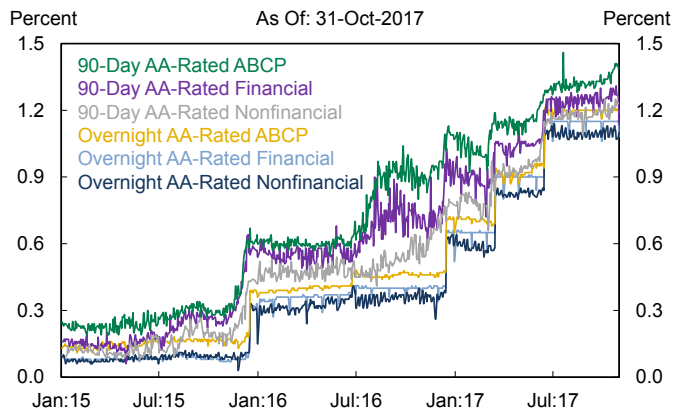
After reaching a nearly two-year high of \$1.1 trillion in April of 2016, total commercial paper (CP) outstanding fell sharply through the remainder of 2016, reaching approximately \$914 billion in early January 2017 before rising back to \$1.1 trillion in October 2017 (**Chart 4.9.1**). Lower volumes in foreign financial CP accounted for the majority of the decline, falling \$60 billion in 2016 to \$201 billion, before rebounding to \$266 billion as of October 2017. Domestic financial CP outstanding also fell through much of 2016 before rebounding somewhat in 2017, reaching \$232 billion at the end of the October 2017. The decline in this segment of the market was driven by a reduction in CP issued by U.S. subsidiaries of foreign banks. Despite this decline, outstanding CP of domestic financial entities with foreign bank parents remains more than twice as large as outstanding CP issued by domestic financial entities with U.S. parents. Market participants have noted the October 2016 implementation of recent rules pertaining to MMFs contributing to decreased demand for financial CP in 2016 (**see Box C**). However, the CP investor base broadened somewhat in 2016, as declines in purchases by prime MMFs were partially offset by purchases from new investors, including nonfinancial corporates, pension funds, and municipalities.

Interest rates on overnight, AA-rated CP were steady during the first half of 2016. In the second half of 2016, interest rates across all types of 90-day, AA-rated CP rose steadily as demand from prime MMFs waned ahead of

### 4.9.1 Commercial Paper Outstanding



## 4.9.2 Commercial Paper Interest Rates



Source: Federal Reserve Bank of St. Louis

the implementation of the new MMF rules in October of 2016. In late 2016 and 2017, interest rates increased along with FOMC decisions to raise the target range for the federal funds rate in December 2016 and March and June in 2017 (Chart 4.9.2).

### Large Time Deposits

Large time deposits at commercial banks, which include wholesale certificates of deposit (CDs), fell steadily over the second half of 2016 before rising slightly in 2017 to reach approximately \$1.59 trillion as of October. This total is 2.6 percent lower than at year-end 2015 and 26 percent below its 2008 peak. As with financial CP, market participants have attributed much of the decrease in 2016 to lower demand from prime MMFs as a result of recent reforms.

## 4.9.2 Secured Borrowing

### Repo Markets

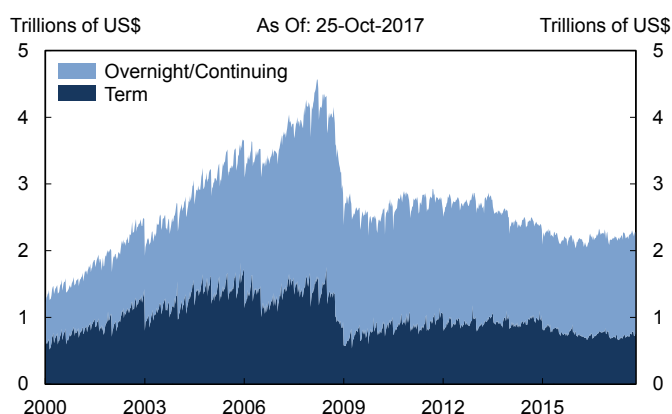
Activity in the U.S. repo market has been generally stable over the past year. The market consists of two segments: tri-party repo, in which settlement occurs through a system operated by a clearing bank that provides collateral management services, and bilateral repo, which typically refers to all activity not settled within the tri-party system. The FICC provides CCP services to portions of both segments of the repo market, though neither segment is fully centrally cleared. The tri-party system includes the General Collateral Finance (GCF) repo service, a FICC-operated facility that provides blind-brokered trades, while the bilateral system includes the FICC-operated Delivery-versus-Payment (DVP) repo service. FICC GCF repo service was recently expanded to allow certain institutional investors to participate in the new Centrally Cleared Institutional Triparty Service. FICC also expanded member-sponsored services to permit additional clients to lend cash and U.S. treasuries via their sponsoring members throughout the day.

Total repo market borrowing by primary dealers ranged between \$2.0 and \$2.3 trillion in 2016 and 2017 through October (**Chart 4.9.3**). The fraction of financing at different maturities has also remained relatively flat over the year, with about two-thirds of financing occurring overnight, against primarily high quality fixed income instruments, such as government and agency securities. Of the remaining one-third, slightly more volume was funded at maturities one month or longer than at terms shorter than one month.

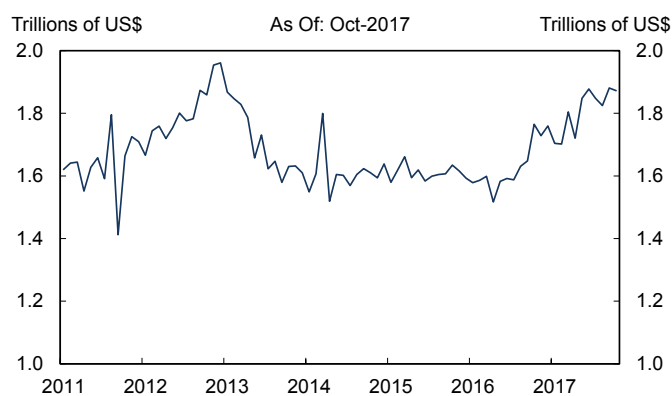
The tri-party market will undergo a structural change in the coming years, as JPMorgan Chase announced in July 2016 that it plans to cease settlement of government securities by year-end 2018, which will leave Bank of New York Mellon as the sole tri-party repo clearing bank for these securities. Separately, in July 2016, FICC suspended the execution of GCF repo transactions on an interbank basis, meaning that GCF dealers are now only able to execute transactions with market participants that also settle with the same clearing bank.

Tri-party activity exclusive of GCF transactions trended slightly upwards over the past year and a half, from \$1.6 trillion in March 2016 to \$1.9 trillion in October 2017 (**Chart 4.9.4**). The composition of collateral in these transactions continued to drift towards safer asset classes over the period, as it had in the prior year, with the dollar volume of transactions backed by Fedwire-eligible collateral edging up slightly from 81 percent to 82 percent (**Chart 4.9.5**). Median haircuts required on collateral used in tri-party repo transactions were largely flat over the year across collateral classes. Most types of Fedwire-eligible collateral featured median haircuts of 2 percent, while other types of collateral featured median haircuts ranging from 2 percent to 15 percent.

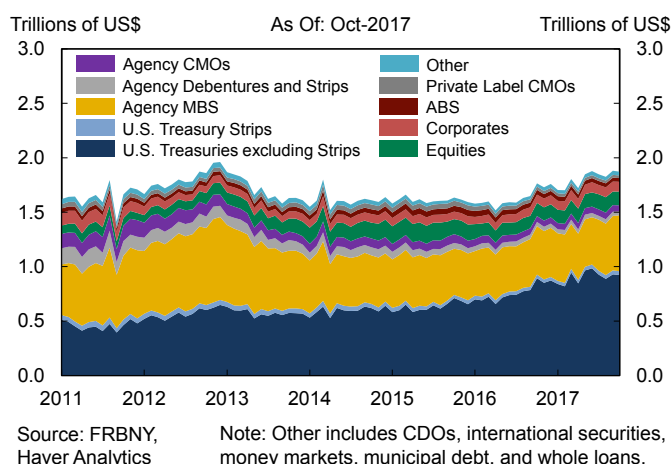
#### 4.9.3 Primary Dealer Repo Agreements



#### 4.9.4 Value of the Tri-Party Repo Market

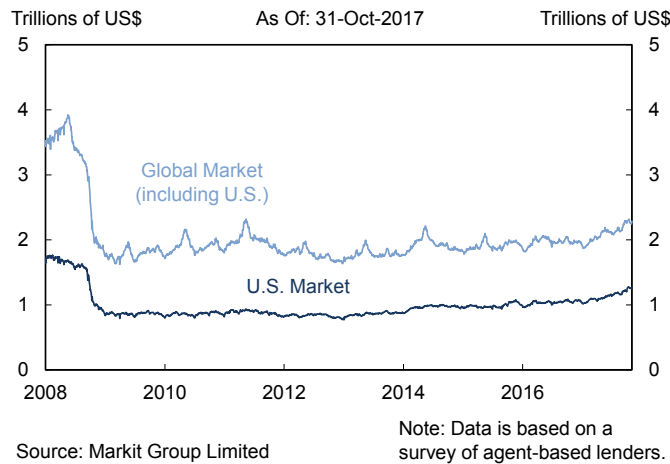


#### 4.9.5 Collateral in the Tri-Party Repo Market





#### 4.9.6 Value of Securities on Loan

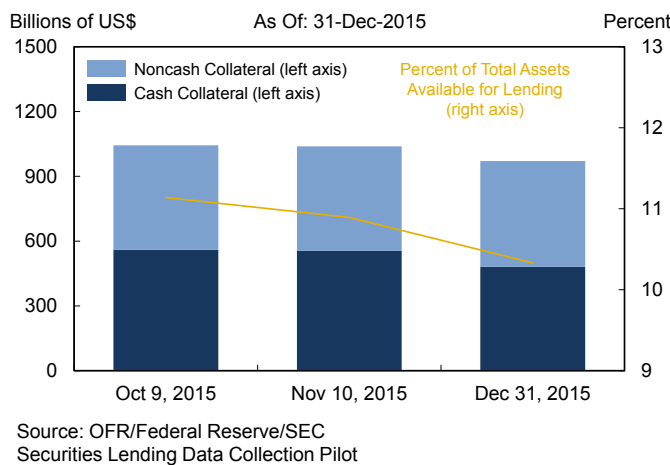


#### Securities Lending

The value of securities on loan globally was largely unchanged in 2016 but rose from \$1.9 trillion at year-end 2016 to \$2.3 trillion as of October 2017 (Chart 4.9.6). To improve data collection on securities lending, in 2014 the OFR, the Federal Reserve System, and the SEC began a pilot data collection project focused on activity in this area, and agencies' staff published a summary of their findings in 2016. Seven lending agents participated on a voluntary basis, and provided a snapshot of their securities lending books at the closing of each of three reporting days in 2015.

The pilot indicated that lending agents held, on average, \$9.44 trillion in securities available for lending, although not all of those securities may be available at the same time. There were on average \$1.02 trillion in securities loans outstanding in the U.S., representing approximately 10.8 percent of total lendable assets (Chart 4.9.7). Pension funds and endowments, on average, had \$332 billion of securities on loan, the most of any securities owner type, followed closely by governmental entities—which include central banks and sovereign wealth funds—at about \$327 billion (Chart 4.9.8).

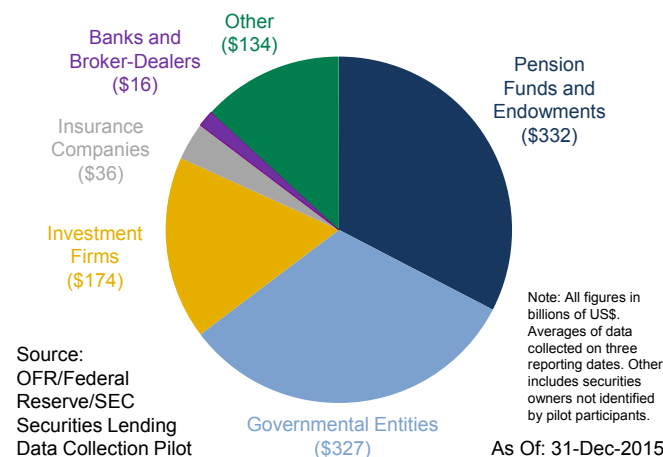
#### 4.9.7 Securities on Loan Against Cash and Noncash Collateral



Lending agents indemnified nearly all securities owners reported in the pilot, with at least 97 percent of loans including such provisions across all major categories of securities owners. Indemnification provisions generally stipulate that the lending agent compensate the security owner if the borrower defaults and the pledged collateral is insufficient to replace the lent security.

The majority of borrowers were broker-dealers, which borrowed, on average, \$869 billion in securities. Brokers generally borrow securities to facilitate short sales and to resolve fails to deliver. Hedge funds and state pension funds together borrowed less than \$10 billion.

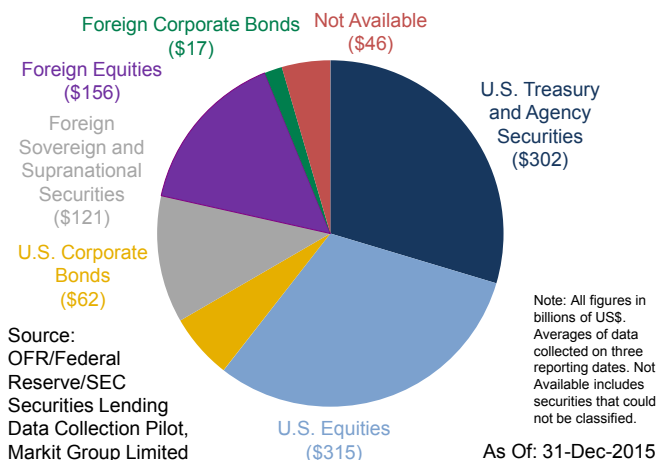
#### 4.9.8 Securities on Loan by Owner Type



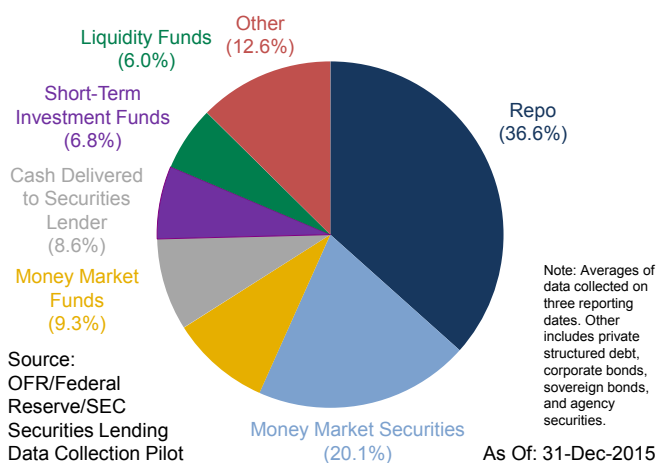
Equities—both domestic and foreign—comprised the largest share of securities on loan, at approximately 46 percent, with sovereign bonds accounting for an additional 42 percent (**Chart 4.9.9**). U.S.-issued securities and U.S. equities comprised 67 percent of the total. Mean lending fees for loans of foreign equity securities were significantly higher than those for foreign sovereign and supranational bonds.

On average, the collateral received was about equally split between cash and noncash. Around 37 percent of the total cash collateral was reinvested in the repo market, including repos backed by government and other types of securities (**Chart 4.9.10**). Over 20 percent of the total was reinvested in money market securities. MMFs were the third largest category at around 9 percent. Approximately 9 percent of cash collateral was delivered to the securities owners; consequently, the reinvestment of that portion of collateral is unknown.

#### 4.9.9 Securities on Loan by Asset Class

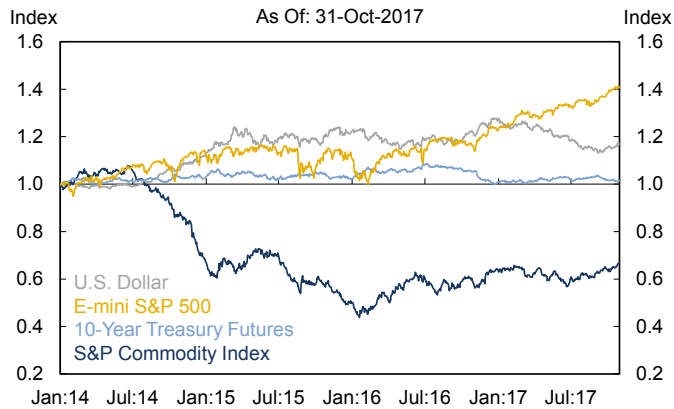


#### 4.9.10 Securities Lending Cash Collateral Reinvestment



## 4.10 Derivatives Markets

### 4.10.1 Normalized Futures Prices



Source: Bloomberg, L.P.

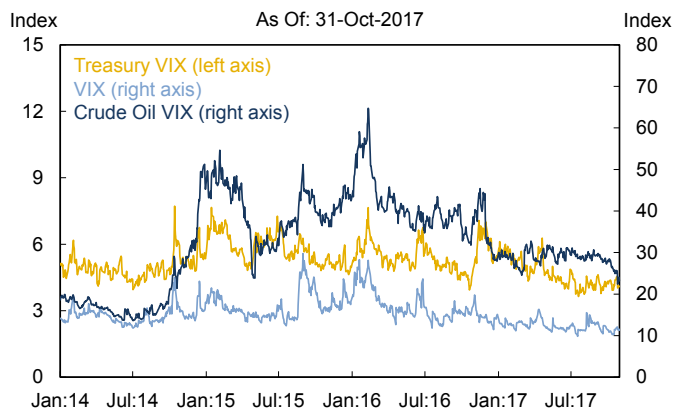
Note: 2-Jan-2014 = 1.0.

### 4.10.1 Futures

Prices in a number of futures market segments paralleled movements in their underlying assets for 2016 and 2017; equity futures have risen steadily through 2016 and 2017, U.S. dollar futures fell in 2017 after reaching multi-year highs in 2016, commodity futures have remained relatively flat in 2017 after rebounding from multi-year lows hit in early 2016, and fixed income futures have remained relatively stable after falling in November and December of 2016 (**Chart 4.10.1**). Volatility in fixed income markets trended lower in 2017 after spiking in the end of 2016, while volatility in oil markets declined in 2016 and 2017 after spiking in early 2016 (**Chart 4.10.2**). Equity market volatility remained at or near historically low levels for most of 2016 and 2017, with the exception of a similar rise in early 2016.

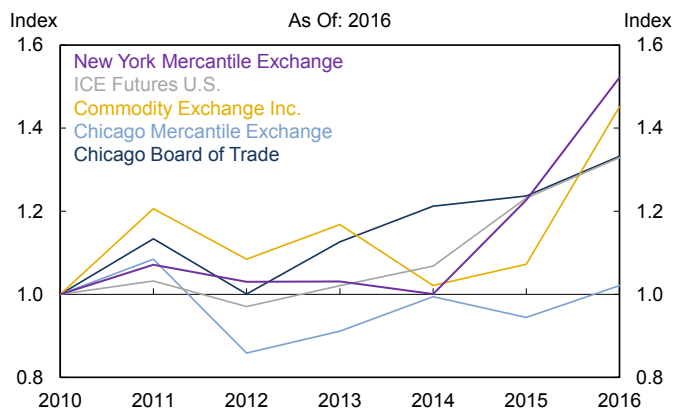
Trading volumes and open interest generally increased across major futures exchanges in 2016, continuing a trend from prior years (**Charts 4.10.3, 4.10.4**). Despite an increase in the number of products offered on commodity futures exchanges, the number of futures products overall fell slightly (**Chart 4.10.5**).

### 4.10.2 Market Volatility Indices



Source: Bloomberg, L.P.

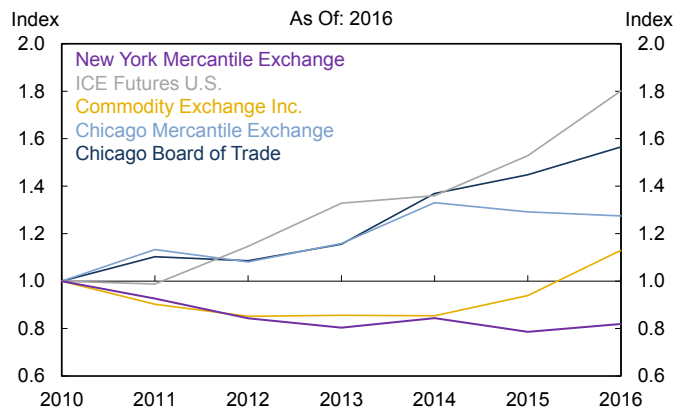
### 4.10.3 Normalized Futures Exchange Volume



Source: CFTC

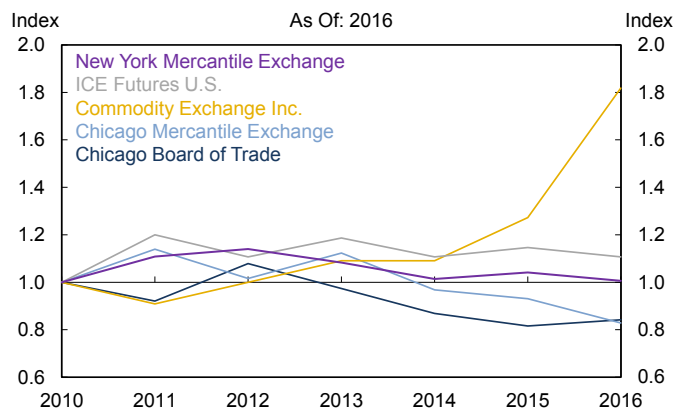
The increased trading volumes apparent in futures markets are believed to be driven in part by the rise of quantitative and automated trading strategies, which are commonly designed for use in highly liquid markets such as those associated with actively traded futures products. The level of automation in futures trading has been increasing in recent years, a trend that continued in 2016 as automation generally exceeded 60 percent of volume across exchanges (Chart 4.10.6). Automation of options trading has seen less consistent trends, with levels in recent years usually in the 40-50 percent range, depending on exchange and time period (Chart 4.10.7).

#### 4.10.4 Normalized Futures Exchange Open Interest



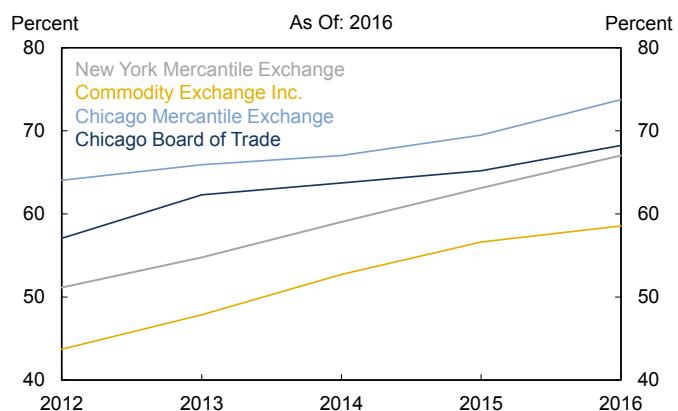
Source: CFTC

#### 4.10.5 Normalized Futures Exchange Number of Products



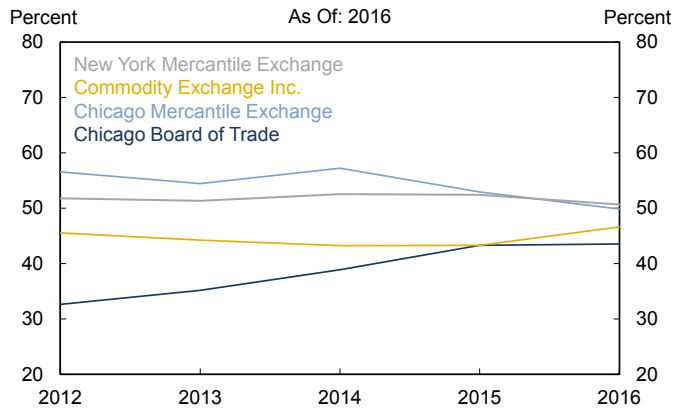
Source: CFTC

#### 4.10.6 Automation in Futures Markets



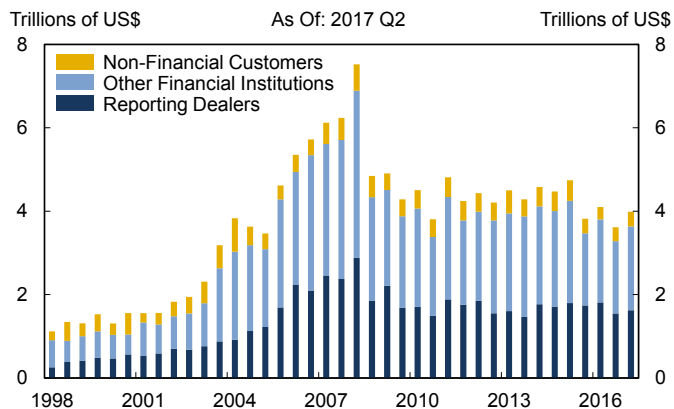
Source: CFTC

#### 4.10.7 Automation in Options Markets



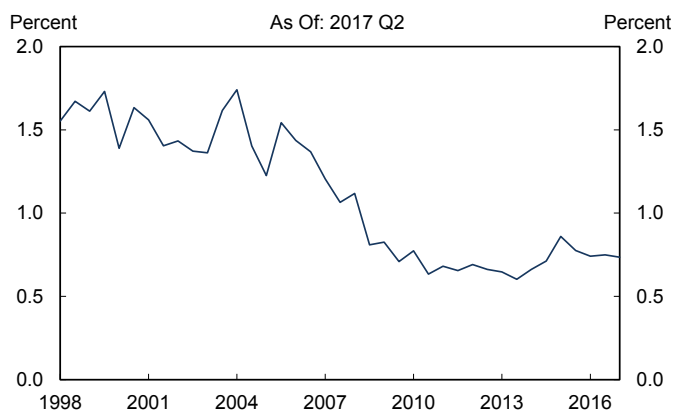
Source: CFTC

#### 4.10.8 OTC Equity Options: Global Notional Outstanding



Source: BIS, Haver Analytics

#### 4.10.9 OTC Equity Option Share of All OTC Derivatives



Source: BIS, Haver Analytics

#### 4.10.2 Options

Currently, there are fifteen registered national securities exchanges that list and trade standardized equity options. Over half of these exchanges (or options facilities of existing exchanges) were established in the last decade, including, more recently, ISE Mercury in January 2016 and MIAX Pearl in December 2016. Transactions in securities based standardized options are all centrally cleared by a single clearing agency—the Options Clearing Corporation, which required approximately \$50 billion in total initial margin against those transactions as of the second quarter of 2017. The Options Clearing Corporation is also the issuer and guarantor of each standardized options contract. Total exchange-traded equity options volume has been relatively steady for much of the past ten years. As of October 2017, there were nearly 4,500 equity securities underlying exchange-traded equity options.

With respect to over-the-counter (OTC) equity options, Bank for International Settlements (BIS) data shows that the global notional amount outstanding of OTC equity options was approximately \$4.0 trillion as of the second of 2017, remaining within the relatively narrow range seen since the second half of 2008 (**Chart 4.10.8**).

While the notional amount of outstanding OTC equity options is large in absolute magnitude, OTC equity options accounted for less than 1 percent of the global OTC derivatives market as of the second quarter of 2017 (**Chart 4.10.9**). BIS data also shows that the global market value of OTC equity options transactions was \$338 billion as of the second quarter of 2017, significantly below record levels reported in the fourth quarter of 2007 (**Chart 4.10.10**).

Within the U.S. banking sector, OTC equity option exposures are concentrated in a small number of major institutions. The six largest BHCs by total assets had written approximately 96 percent of the \$1.3 trillion total OTC equity option notional outstanding written by all BHCs as of the third quarter of 2017. Similarly, by that

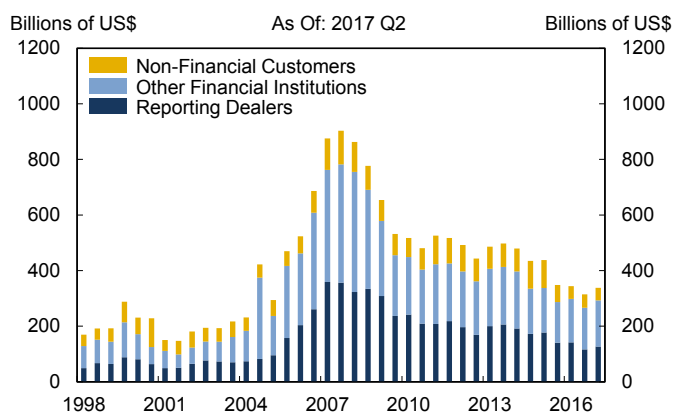
point the six largest BHCs also held purchased options representing approximately 94 percent of the \$900 billion in total OTC equity option notional outstanding held by all BHCs.

### 4.10.3 OTC Derivatives

In the United States, the gross notional outstanding of OTC interest rate and credit index derivatives declined slightly in 2016; the notional outstanding of OTC interest rate derivatives declined 19 percent year-over-year to \$201 trillion and the notional outstanding of credit index derivatives declined 24 percent to \$3.6 trillion (**Chart 4.10.11**). The notional outstanding of OTC interest rate and credit index derivatives increased in 2017, but remain slightly below levels reported in 2015; as of October 2017, the notional outstanding of OTC interest rate and credit index derivatives stood at \$245 and \$4.6 trillion respectively.

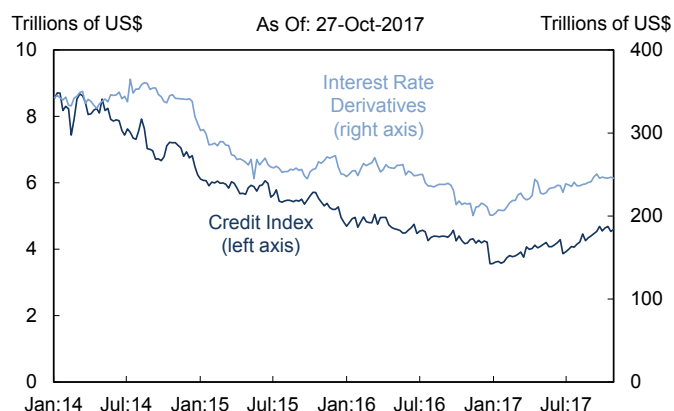
In 2016, the average weekly volumes for OTC interest rate derivatives increased 70 percent year-over-year, to \$4.5 trillion in the fourth quarter of 2016 compared to the same period in 2015 (**Chart 4.10.12**). Trading volumes for OTC interest rate derivatives continued to increase through 2017, and the average weekly volume rose to \$5.7 trillion in the third quarter of 2017. Increased trading activity in interest rate swaps primarily occurred in shorter tenor swaps, which may be attributed to increased hedging and speculative demand in anticipation of rate rises. Trading volumes for credit index derivatives also increased in 2016 and 2017, albeit at a slower pace. In 2016, the fourth quarter average weekly volumes for credit index derivatives increased 5.2 percent year-over-year to \$559 billion, and increased in the third quarter of 2017 to \$710 billion.

### 4.10.10 OTC Equity Options: Global Market Value



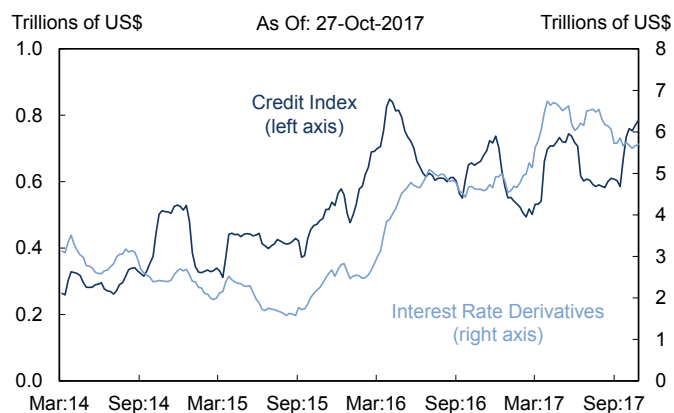
Source: BIS, Haver Analytics

### 4.10.11 Derivatives Notional Amount Outstanding



Source: CFTC

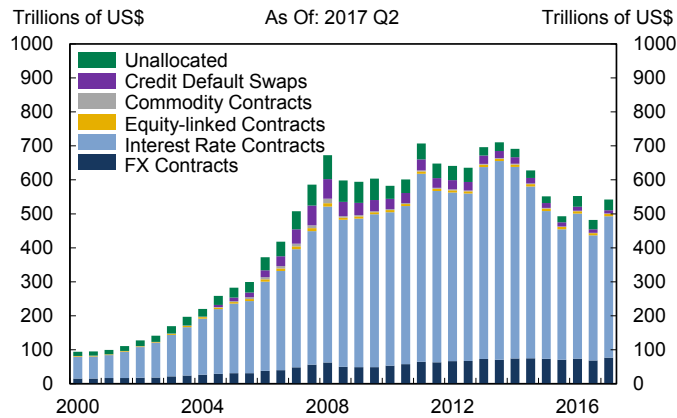
### 4.10.12 Derivatives Notional Volume



Source: CFTC

Note: 12-week moving averages.

#### 4.10.13 Global OTC Derivatives Market

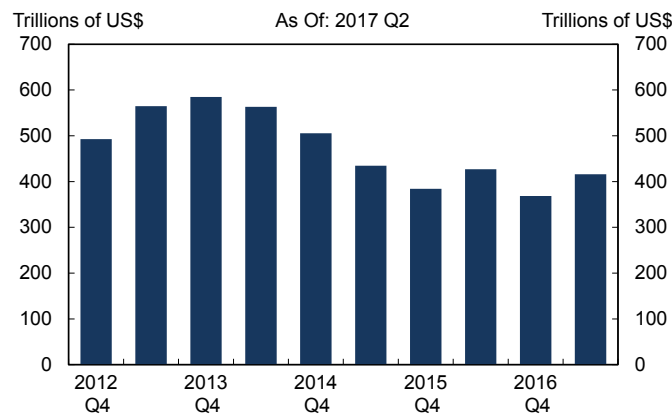


Source: BIS, Haver Analytics

Note: Notional amounts.

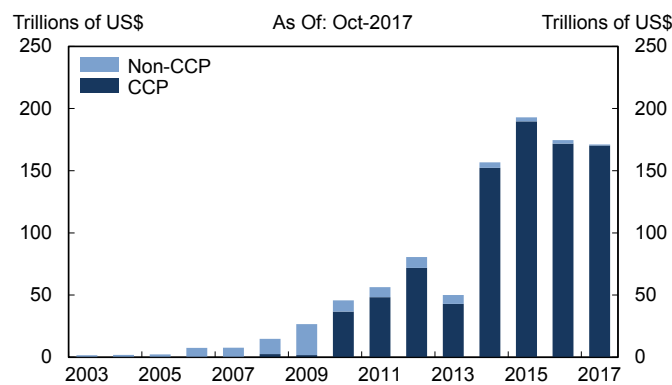
Globally, the gross notional amount outstanding for OTC derivatives across asset classes fell 1.9 percent year-over-year to an estimated \$542 trillion in June 2017 (Chart 4.10.13). The overall rate of contraction slowed over the past 18 months, following average declines of 13.5 percent annually in 2014 and 2015. This recent decline has been driven primarily by a 2.6 percent year-over-year contraction in interest rate derivatives notional, to \$416 trillion in June 2017 (Chart 4.10.14).

#### 4.10.14 Interest Rate Derivatives: Global National Outstanding



Source: BIS, Haver Analytics

#### 4.10.15 Interest Rate Derivative Compression Volume



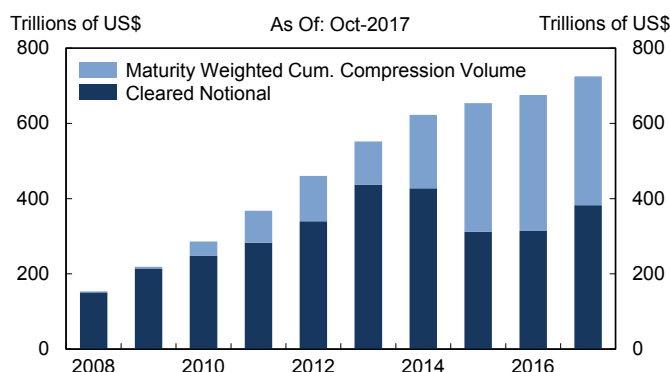
Note: Gross notional is represented as single-counted for notional compressed outside of a CCP and double-counted for notional compressed inside of a CCP.

Source: TriOptima

The decline in interest rate derivatives notional amount outstanding may be largely attributable to compression activity. Compression is a risk management tool used by market participants to close OTC derivatives contracts with offsetting or nearly offsetting risk, in effect reducing the number of transactions and gross notional amount outstanding in market participants' OTC derivatives portfolios. Compression activity has grown rapidly in recent years, supported by the growth of central clearing and CCP compression service offerings. The increased compression activity led to a \$346 trillion reduction in interest rate derivatives notional amount outstanding in 2016 and the first half of 2017, and a \$684 trillion reduction since 2014 (Chart 4.10.15). Adjusted for compression, however, total notional of cleared OTC interest rate derivatives has increased by 10.8 percent since December 2015 (Chart 4.10.16).

The global notional outstanding of both single-name and index credit derivatives declined to an estimated \$9.3 trillion by the second quarter of 2017, below its pre-crisis level, driven by a reduction in inter-dealer activity and a decline of investor appetite for credit derivatives (Chart 4.10.17, 4.10.18).

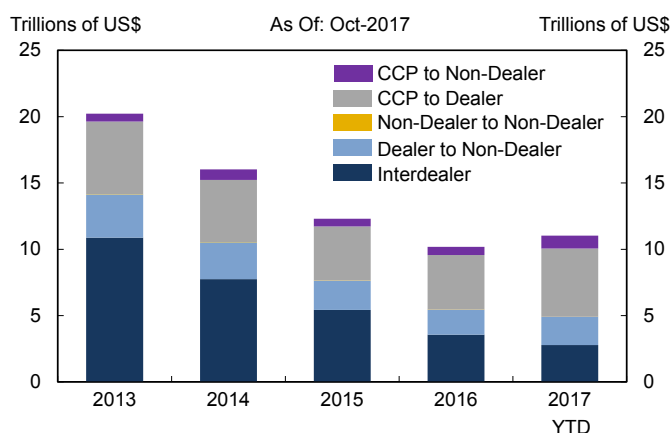
#### 4.10.16 Global Cleared OTC Interest Rate Derivatives



Source: ClarusFT CCPView, TriOptima, LCH.SwapClear

Note: Maturity weighted cumulative compression volume is calculated as the sum of the current and previous year's compression volume, estimating with two year average maturity for the compressed trades. 2017 data is year-to-date.

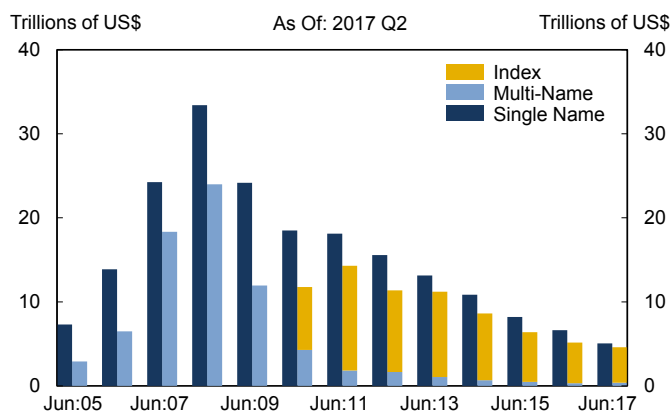
#### 4.10.17 Credit Derivatives by Counterparty



Source: DTCC

Note: Gross notional outstanding.

#### 4.10.18 Global Credit Derivatives by Product

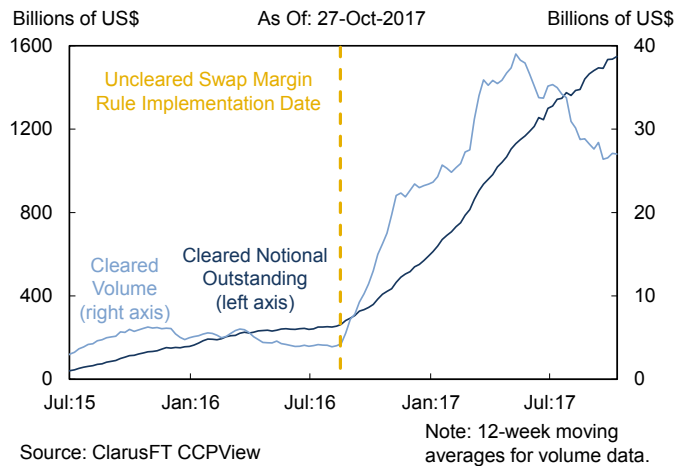


Source: BIS

Note: Gross notional outstanding.



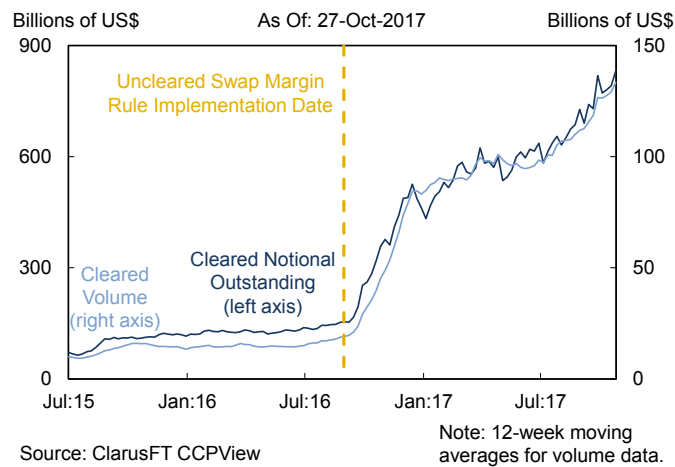
#### 4.10.19 Interest Rate Derivatives Inflation Swap Clearing



#### Impact of Margin Rule for Non-Cleared Swaps

The implementation of new U.S. margin requirements for non-cleared swaps in September 2016 led to certain developments in this market. These new requirements, which are one aspect of global reform efforts on OTC derivatives, were intended to promote central clearing and reduce counterparty risk by imposing margin requirements for non-centrally cleared transactions. Regulators in some other jurisdictions, including Canada, Japan, the EU, Singapore, Hong Kong, Switzerland, and Australia, also began implementing their own respective rules in 2016 and 2017.

#### 4.10.20 FX Non-Deliverable-Forward Clearing



While broad trends have not yet fully emerged, the U.S. rule implementation appears to have led to a shift from bilateral to central clearing for certain types of swaps. Within one month of the implementation date, the notional outstanding for cleared inflation swaps increased by approximately 25 percent, and the notional outstanding for cleared foreign exchange non-deliverable forwards increased by approximately 65 percent. Over the same period, the cleared volumes in both products had nearly tripled. The market share of cleared transactions in these products increased significantly in 2016 (**Charts 4.10.19, 4.10.20**). While these two products are not currently mandated for central clearing, they can be cleared voluntarily at CCPs, and the implementation of the margin rule has incentivized clearing for these products.

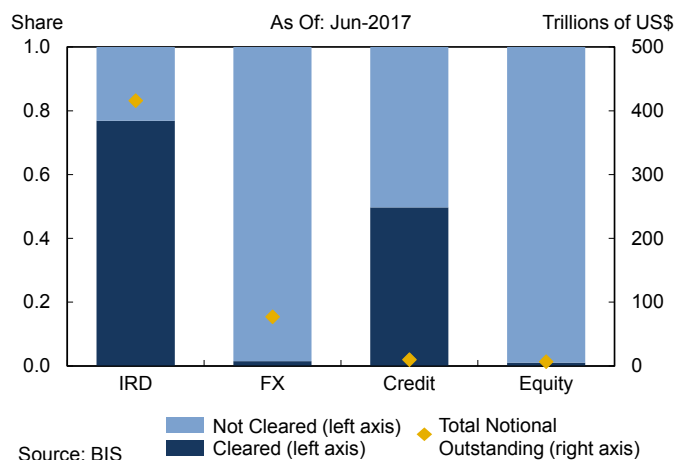
#### 4.10.4 Central Counterparty Clearing

The share of OTC derivatives transactions cleared at CCPs continued to grow globally, as jurisdictions continue to implement requirements for central clearing. In 2016, the EU began to require central clearing for certain derivatives, joining some other jurisdictions, including the United States, which implemented central clearing rules in 2013. According to the Financial Stability Board (FSB), as of June 2017, 17 of 24 FSB member jurisdictions had comprehensive frameworks in place to determine when standardized OTC derivatives should be centrally cleared.

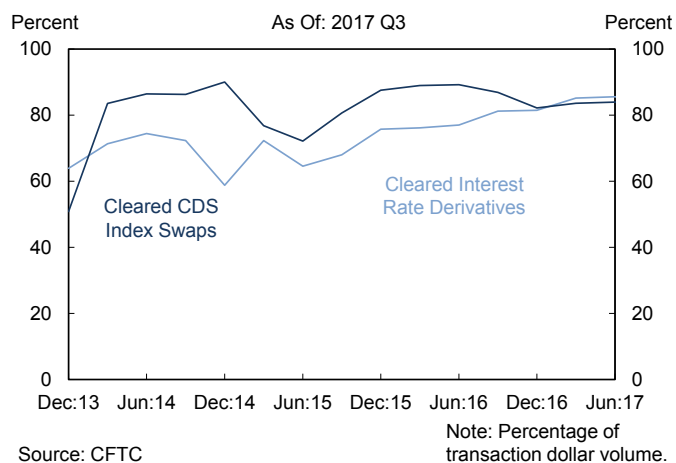
Measured by gross notional outstanding overall, cleared OTC derivatives constituted approximately 77 and 43 percent of outstanding OTC interest rate and OTC credit derivatives globally, respectively, and less than 2 percent each for both OTC foreign exchange and OTC equity derivatives globally in June 2017 (**Chart 4.10.21**). Globally, approximately \$320 trillion in notional of OTC interest rate derivatives and \$4.9 trillion in notional of OTC credit derivatives were cleared by June 2017.

Clearing activity has increased substantially in interest rate derivatives, primarily due to the greater share of standardized products covered by clearing mandates and greater availability of clearing services. Both the volume of total compression activity as well as the share of compression activity occurring within CCPs has also increased significantly in recent years. In the United States, the share of new transaction volume for interest rate derivatives that is centrally cleared has grown on average by 8.7 percent annually since 2013, reaching 86 percent of the market in the second quarter of 2017. Within the market for credit default swaps (CDS) on indices, 84 percent of weekly notional volumes were centrally cleared during the second quarter of 2017 (**Chart 4.10.22**). Clearing volumes remain concentrated with LCH.Clearnet Ltd. and CME Group Inc. for interest rate swaps and with ICE Clear Credit and ICE Clear Europe for CDS.

4.10.21 Global OTC Central Clearing Market Share



4.10.22 U.S. Central Clearing Market Share



Margin calls related to sharp market movements, such as those observed following the June 23, 2016 UK referendum to leave the EU, have led to funding liquidity concerns among clearing members. On the day after the UK referendum, the five largest CCPs, which constitute most of the clearing market globally, issued calls for approximately \$27 billion in variation margin across derivatives products, totaling approximately five times the daily average experienced in the previous year. Although clearing members were able to meet these calls, differing intraday margin call practices across CCPs and mismatches between when margin on positions is due from dealers and when excess margin is released forced dealers to post a significant amount of margin intraday. These funding liquidity stresses are often also greater for clearing members that offer client clearing services because they are required to post additional collateral for client trades as well as for their own. These developments have led to concerns among market participants that their funding liquidity could be significantly impaired during future periods of high market volatility. In response, market participants have begun reassessing margining and liquidity management practices to ensure such variation margin calls can be met in the future. Relevant authorities have also been working with CCPs and their members to assess and implement changes to operational and liquidity policies and procedures to mitigate these concerns. In October 2017, the CFTC issued a report detailing its evaluation of CCP funding liquidity under stressed conditions ([see Box D](#)).

#### 4.10.5 Futures Commission Merchants

Futures Commission Merchants (FCMs) are the CCP members that provide customers the ability to clear futures and swap transactions. The increased use of central clearing for certain derivative products has increased the importance of FCM services in recent years.

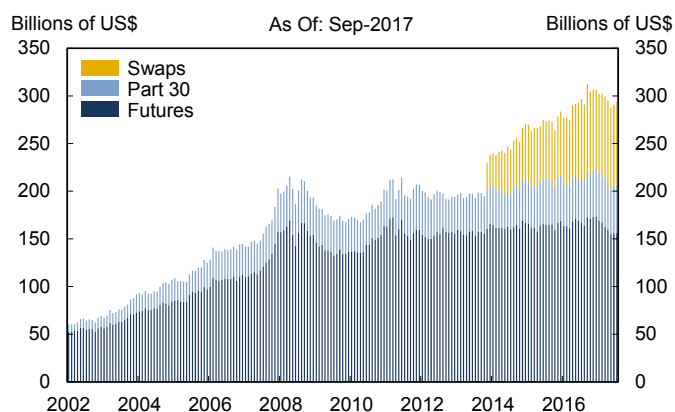
FCMs generally collect initial and variation margin from customers and deposit the required amounts with the CCP. Additionally, FCMs guarantee the client performance to the CCP, exposing them to potential loss should the client default, and may have contingent financial obligations under the CCP's mutualized loss allocation mechanisms.

With respect to more established businesses, like clearing of futures and options on futures, the level of customer margin funds held by FCMs has remained fairly flat since the financial crisis (**Chart 4.10.23**). For the cleared swaps business, where customer clearing and associated data collection have been more recently introduced, the level of customer margin funds held by FCMs has increased from about \$50 billion at year-end 2014 to approximately \$87 billion as of the end of September 2017.

For futures and options on futures, the number of FCMs registered with the CFTC holding customer funds has fallen from just over 100 in 2002 to 57 (of which 28 are bank affiliated FCMs) as of September 2017 (**Chart 4.10.24**). For the cleared swaps business, the number of FCMs reporting nonzero balances of segregated client funds decreased from 23 at year-end 2014 to 20 (of which 17 are bank-affiliated FCMs) at the end of September 2017. FCMs affiliated with the largest U.S. banking organizations now hold about 75 percent of all segregated client funds supporting cleared swaps held by registered FCMs, up from about 50 percent in mid-2014.

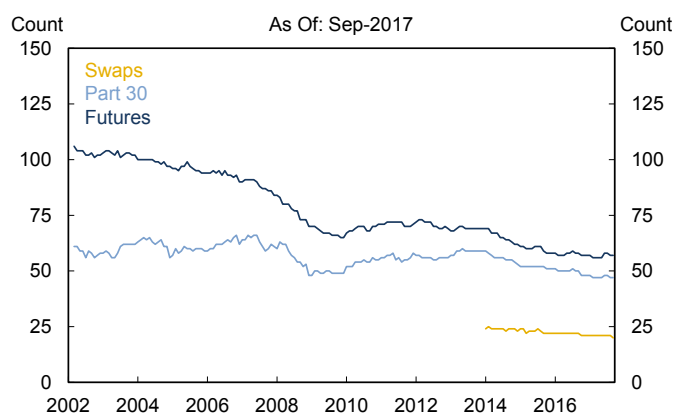
A portion of the decline in the number of FCMs reflects the continuation of a long-term trend of business consolidation among FCMs due to technology and other market structure related

#### 4.10.23 Margin Funds Held at FCMs



Source: CFTC, FIA

#### 4.10.24 FCMs Holding Client Funds



Source: CFTC, FIA

changes. However, some market participants have indicated that regulatory capital requirements arising from the supplementary leverage ratio (SLR), are causing them to re-examine their client-clearing services.

One potential concern is whether the reduction in the number of FCMs could create difficulties in porting customer margin between FCMs after a default event. In the event of an FCM default, the ability to port customer positions and margin is contingent on the existence of FCMs that are willing and able to expand their customer clearing business in a time of stress. FCMs need to have sufficient capital to fund the new business, including meeting capital requirements related to these new customer positions as well as incremental contributions to the guarantee fund based on incremental risks cleared. If healthy FCMs are unwilling or unable to accept these new customers, it might be necessary to liquidate the positions of the customers of the defaulting FCM, which could have negative market consequences.

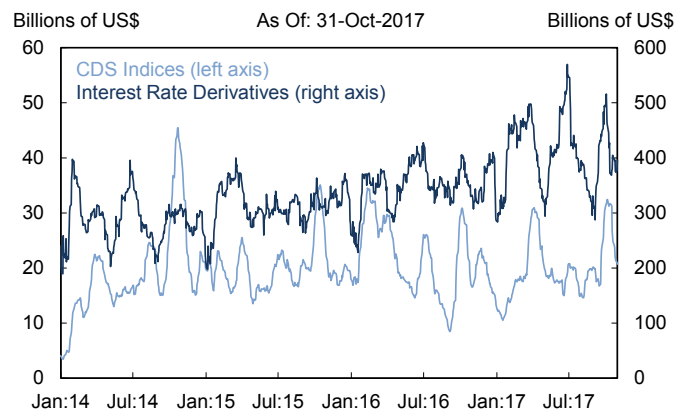
Some market participants and CCPs have been exploring two potential approaches to this issue that may address their needs. In a few cases, proprietary firms have chosen to become clearing members, directly facing the CCP rather than using an FCM intermediary. In other cases, CCPs are working to introduce options for more direct client clearing. In this arrangement, customers would pay initial and variation margin directly to the CCP, but would also have an FCM provide credit protection to the CCP in case of a failure to pay. Such an arrangement is designed to reduce the capital required to be allocated towards customer clearing activity. U.S. financial regulators continue to evaluate but have not yet permitted any of these options, as these direct clearing approaches present challenges for traditional regulatory oversight of market participants. Given that these options may not be feasible for many market participants, regulators continue to monitor FCM industry trends and the possible implications for financial stability, particularly in stressed market conditions.

#### 4.10.6 Regulated Platform Trading

In the United States, mandatory trading of swaps related to certain interest rate and CDS indices on regulated platforms has been in effect since 2014. The CFTC has granted full registration to 25 swap execution facilities (SEFs), a new type of regulated OTC derivatives trading platform that provides additional pre-trade and post-trade information, such as bid-offer spreads. Globally, jurisdictions continue to implement the 2009 commitment by G-20 leaders that standardized OTC derivatives should be traded on exchanges or electronic platforms, where appropriate. Combined with central clearing, the use of these new types of trading platforms can increase the level of transparency, reduce operational risk, and improve end-to-end processing. However, the CFTC is concerned that there may exist a trade-off between increasing pre-trade transparency and ensuring robust market liquidity.

Trading volumes on SEFs continued to increase in 2016 and 2017, with average daily notional volume for interest rate and credit index derivatives up 26 percent since the fourth quarter of 2015, to \$412 billion in the third quarter of 2017 (Chart 4.10.25). However, the market share of interest rate and credit index derivatives trading on SEFs has remained relatively flat, following increases during the first two years of SEF trading (Chart 4.10.26).

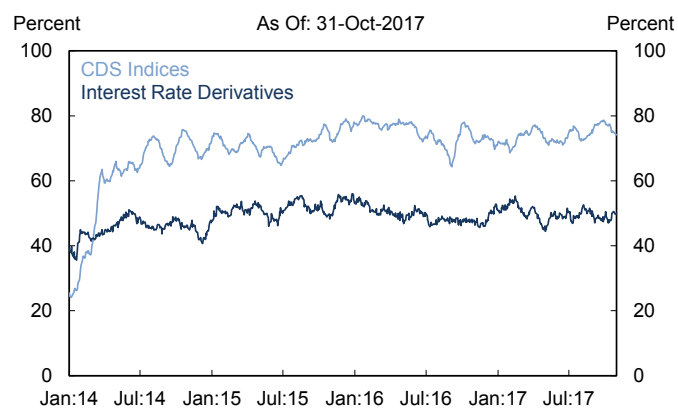
#### 4.10.25 U.S. On-SEF Trading Volume



Source: ISDA SwapsInfo

Note: 20-day moving averages.

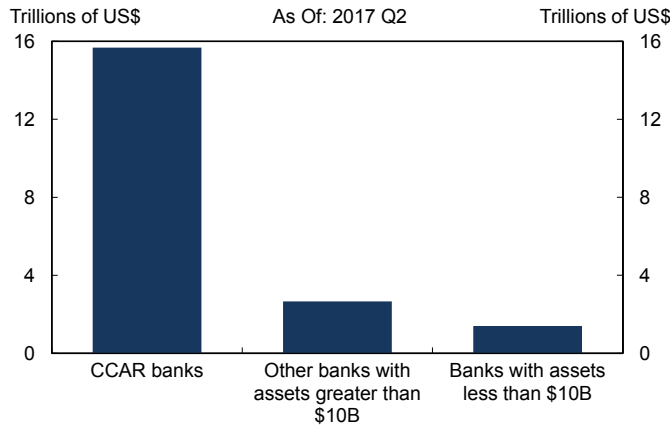
#### 4.10.26 U.S. On-SEF Trading Share



Source: ISDA SwapsInfo

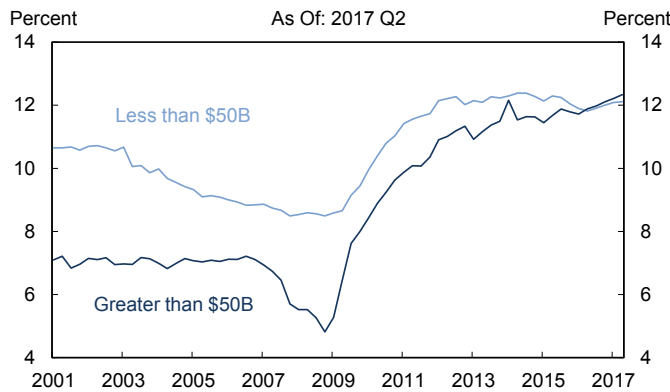
Note: Share of notional volume.  
20-day moving averages.

#### 4.11.1 BHC Total Assets



Source: FR Y-9C

#### 4.11.2 Common Equity Tier 1 Ratios



Note: Prior to 2014:Q1, the numerator of the common equity tier 1 ratio is tier 1 common capital. Beginning in 2014:Q1 for advanced approaches BHCs and in 2015:Q1 for all other BHCs, the numerator is common equity tier 1 capital.

Source: FR Y-9C

### 4.11 Bank Holding Companies and Depository Institutions

#### 4.11.1 Bank Holding Companies and Dodd-Frank Act Stress Tests

BHCs are companies with at least one commercial bank subsidiary. Subsidiaries of BHCs may also include nonbanks such as broker-dealers, investment advisers, or insurance companies. As of the second quarter of 2017, BHCs in the United States with more than \$10 billion in assets held about \$18 trillion in assets. About 85 percent of this total was held by the 34 BHCs that participated in the Federal Reserve's 2017 stress testing and capital planning exercises (**Chart 4.11.1**).

#### Capital Adequacy

Capital levels at BHCs have risen significantly since the 2008 financial crisis. At companies with more than \$50 billion in assets, the ratio of CET1 capital to RWAs has more than doubled since the crisis, while for smaller banks, capital ratios increased by about 50 percent over the same period (**Chart 4.11.2**). High levels of equity capital provide a buffer to absorb losses from operational and legal risks, or from losses on loans, securities, trading portfolios, or off-balance sheet exposures. Although the requirements under the post-crisis implementation of U.S. regulatory capital rules will continue to be phased in over the next few years, all of the global systemically important bank holding companies (G-SIBs) headquartered in the United States already meet the new standards for minimum risk-based capital ratios, supplementary leverage ratios, capital conservation buffers, and surcharges related to systemic importance.

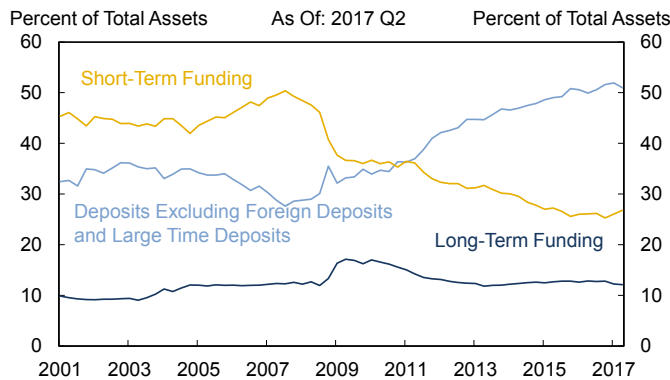
On July 1, 2016, foreign banking organizations (FBOs) with sizeable operations in the United States were required to consolidate all non-branch assets under a single BHC called an Intermediate Holding Company (IHC). The 12 IHCs operating in the U.S. have an average CET1 capital ratio of 15.1 percent, with a range from 11.9 percent to 20.9 percent, as of second quarter 2017.

On December 15, 2016, the Federal Reserve finalized a rule to be implemented by January 2019 that will require domestic G-SIBs and U.S. operations of foreign G-SIBs to maintain a minimum level of total loss absorbing capacity (TLAC), which includes a requirement to fund a certain fraction of assets with long-term debt. The amount of TLAC and long-term debt required will increase with the size and complexity of the BHC, reducing the incentives to increase systemic risk-exposures. Furthermore, the long-term debt is required to be subordinate to claims on operating subsidiaries and would convert into equity capital in case of resolution of the BHC. The availability of long-term debt that can serve as a source of capital is intended to facilitate a successful recapitalization of a failed firm without government or taxpayer support to provide additional equity capital. The TLAC provides resources that would be used to maintain the resiliency of operating subsidiaries with critical functions, thereby facilitating an orderly resolution.

On September 8, 2016, the Federal Reserve finalized its framework for setting the Countercyclical Capital Buffer (CCyB) and voted to maintain the CCyB at zero in October 2016 and then again in December 2017. In forming its view about the appropriate level of the U.S. CCyB, the Federal Reserve has indicated that it will monitor a wide range of financial and economic indicators and consider their implications for financial system vulnerabilities. Those vulnerabilities include but are not limited to asset valuation pressures, risk appetite, leverage in the financial and nonfinancial sectors, and maturity and liquidity transformation in the financial sector.



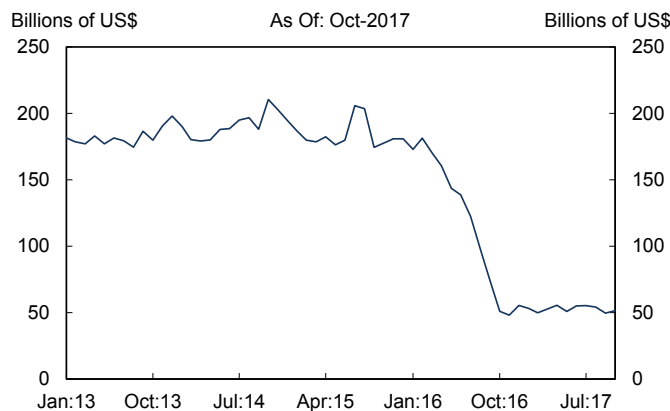
#### 4.11.3 Selected Sources of Funding at CCAR Banks



Note: Long-term funding includes other borrowed money, subordinated notes, and large time deposits with maturities >1 year. Short-term funding includes such liabilities with maturities <1 year plus trading liabilities, repos, CP, and foreign deposits.

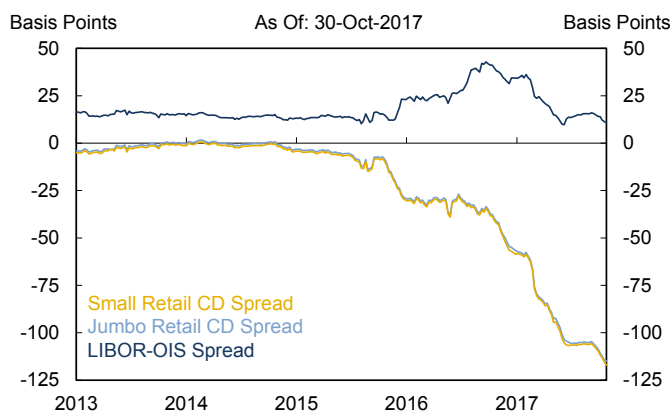
Source: FR Y-9C

#### 4.11.4 Prime Institutional MMF Funding for G-SIBs



Source: SEC, OFR

#### 4.11.5 LIBOR and Deposit Rate Spreads to OIS



Source: FDIC, Federal Reserve Bank of St. Louis, Bloomberg, L.P.

Note: 3-month CD and LIBOR spreads to OIS.

#### Funding Sources

During the 2008 financial crisis, banks experienced disruptions in their access to short-term wholesale funding. Since then, the ratio of such funding to total assets has declined significantly and now stands at about half of its 2007 levels. At the same time, banks experienced large inflows of deposits predominantly in the form of demand deposits, savings, and money market deposit accounts. The banks also maintained a steady share of long-term debt of about ten percent of total assets (Chart 4.11.3).

Following the October 2016 MMF reforms (see Box C), the largest U.S. BHCs experienced a decline in short-term funding from prime institutional MMFs (Chart 4.11.4). Some of this funding outflow was compensated by higher borrowing from the Federal Home Loan Banks (FHLBs). The FHLBs, in turn, were able to meet increased borrowing demands from the BHCs as a result of an increase in funding from government MMFs.

The reduced access to funding from prime MMFs contributed to an increase in the spread between LIBOR and the Overnight Indexed Swap (OIS) rate, a proxy measure for the cost of short-term funding. This spread has declined since the MMF reforms took effect. In contrast, despite increases in the cost of short-term wholesale funding and the target range for the federal funds rate, interest rates on retail deposits have remained essentially unchanged, leading to a widening negative spread between deposit rates and market interest rates (Chart 4.11.5). Retail deposit rates have historically not responded as quickly to increases in market interest rates.

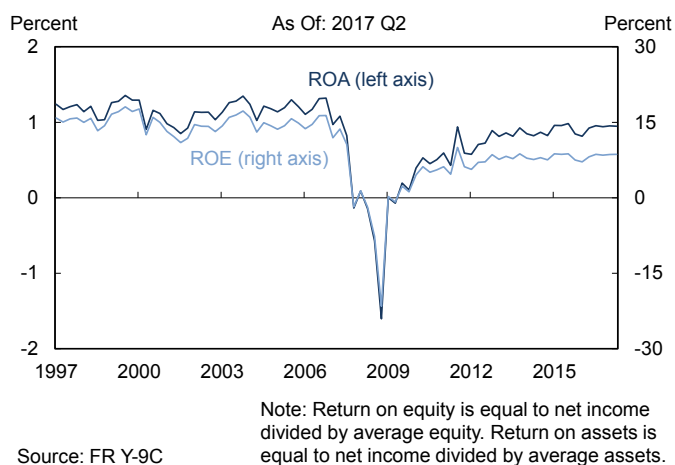
## Profitability

After posting a sharp decline at the beginning of 2016, bank profitability recovered and remained unchanged on a year-over-year basis. BHCs' return on assets (ROA) and ROE remain below pre-crisis levels (**Chart 4.11.6**). Large institutions saw declines in non-interest income in the beginning of 2016, primarily due to declines in trading revenue and servicing income, before rising in the latter part of 2016 and into 2017. In addition, NIMs remained largely the same year-over-year and below their historical average at large institutions with assets greater than \$50 billion (**Chart 4.11.7**). The outlook for NIMs improved in the latter part of 2016 with increases in short-term interest rates being outpaced by increases in long-term interest rates and a resultant steepening of the yield curve. However, continued increases in short-term interest rates in the first part of 2017 have led to a flattening of the yield curve. Legal expenses at the largest banks remained subdued in 2016 and early 2017 after being elevated for several years due to mortgage-related lawsuits (**Chart 4.11.8**). Those low levels of expenses, combined with declines in other noninterest expenses, supported profitability at large BHCs.

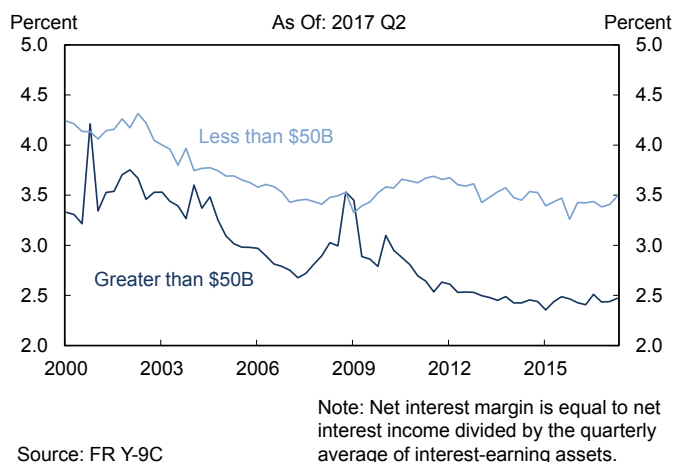
## Asset Quality

Following sharp decreases in oil and natural gas prices, several banks reported significant increases in delinquency rates on loans to oil and gas exploration and production companies in their earnings releases for the first quarter of 2016. With the exception of a few regional banks, those loans represented small fractions of overall C&I portfolios. Banks increased loan loss reserves for such loans and declared plans to limit lines of credit to borrowers in the upstream energy sector. Banks modestly reduced their loan loss reserves in the latter part of 2016 and first half of 2017; reserves were decreased for C&I loan losses, which include leveraged loan losses, and residential real estate loan losses, but increased for credit card loan losses. The share of non-performing loans to total loans continued to trend down in 2016 and 2017 to its lowest level since 2007, though the

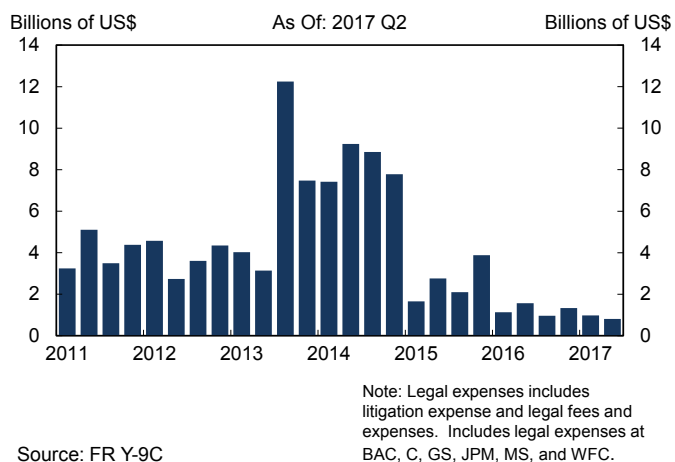
### 4.11.6 Return on Equity and Return on Assets



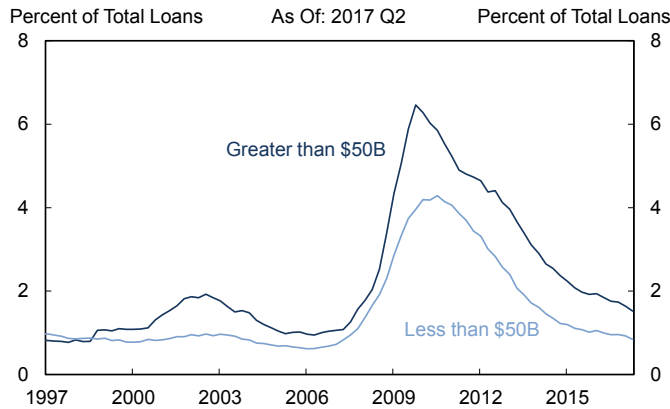
### 4.11.7 Net Interest Margins



### 4.11.8 Legal Expenses at Largest BHCs

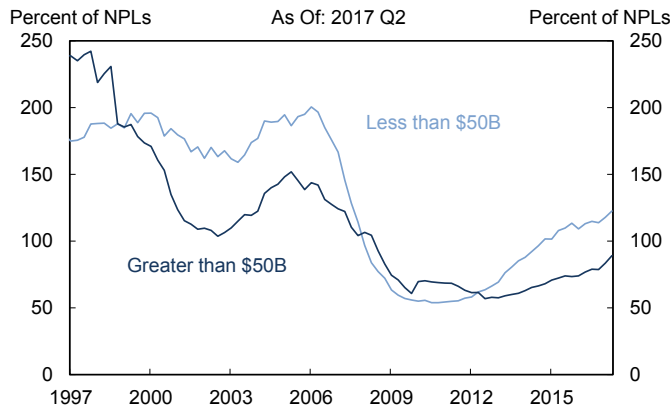


#### 4.11.9 Non-Performing Loans



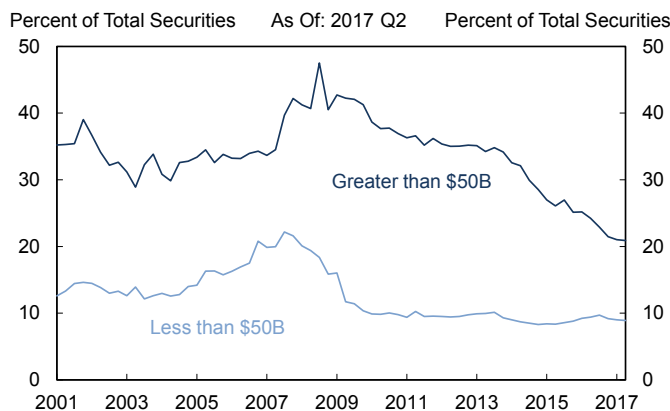
Source: FR Y-9C

#### 4.11.10 Loan-Loss Reserves



Source: FR Y-9C

#### 4.11.11 Higher-Risk Securities



Source: FR Y-9C

relatively large amounts of legacy residential mortgages that are delinquent kept it above the 10-year average that prevailed from 1996 to 2006 for larger institutions (**Chart 4.11.9**). In addition, loan-loss reserves as a proportion of non-performing loans continued to increase but are still below their pre-crisis levels (**Chart 4.11.10**).

Trading asset and securities balances, as a proportion of assets, remained flat in 2016 and early 2017. The share of higher risk securities, such as non-agency asset-backed securities and other structured products, at large BHCs continued to decline and is now at about half of the 2007 level (**Chart 4.11.11**). Since 2010, the largest banks have increased their lending to nondepository financial institutions, while this type of lending has been more muted at smaller institutions over the past few years (**Chart 4.11.12**).

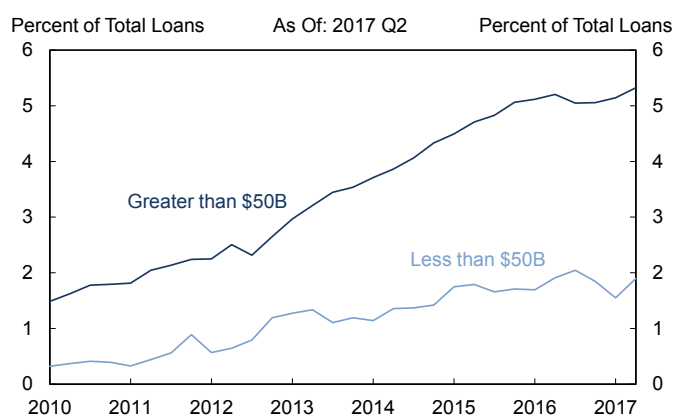
## Liquidity Management

Holdings of high-quality liquid assets (HQLA) have been stable at high levels over the past several years at banks subject to the liquidity coverage ratio (LCR) requirement, reflecting the previous buildup to comply with the LCR. Holdings of HQLA have declined slightly at other banks (**Chart 4.11.13**). While the accumulation of HQLA leveled off in the past two years, the composition of HQLA shifted from reserves into higher yielding agency mortgage-backed securities and Treasury securities at standard LCR BHCs (**Chart 4.11.14**).

In June 2016, the OCC, Federal Reserve, and FDIC released a notice of proposed rulemaking on the net stable funding ratio (NSFR) requirement, which is intended to complement the LCR requirement by defining a liquidity standard with the objective of reducing funding risk over a one-year horizon and limiting the reliance on short-term wholesale funding. Preliminary estimates based on supervisory data of the aggregate NSFR for BHCs subject to the LCR continue to be generally near or above the required 100 percent.

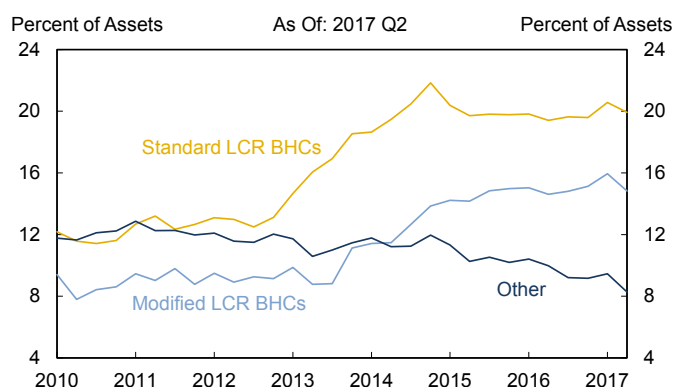
An estimate of the duration gap between the timing of cash inflows from the assets and cash outflows from the liabilities—a measure of interest rate risk at BHCs—has slowly trended up at large BHCs. However, for BHCs with less than \$50 billion in assets, this measure is elevated, suggesting such institutions have a heightened sensitivity to interest rate fluctuations (**Chart 4.11.15**). These institutions derive a much larger share of income from net interest income. Therefore, earnings and capital are more susceptible to fluctuations in net interest income due to changes in interest rates.

### 4.11.12 Loans to Nondepository Financial Institutions



Source: FR Y-9C

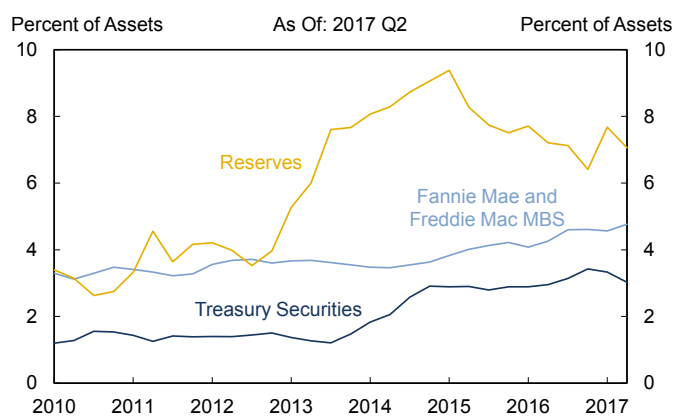
### 4.11.13 Selected High-Quality Liquid Assets at BHCs



Note: HQLA is estimated by adding excess reserves to an estimate of securities that qualify for HQLA. Securities are estimated from the FR Y-9C. Haircuts and level 2 asset limitations are incorporated into the estimate.

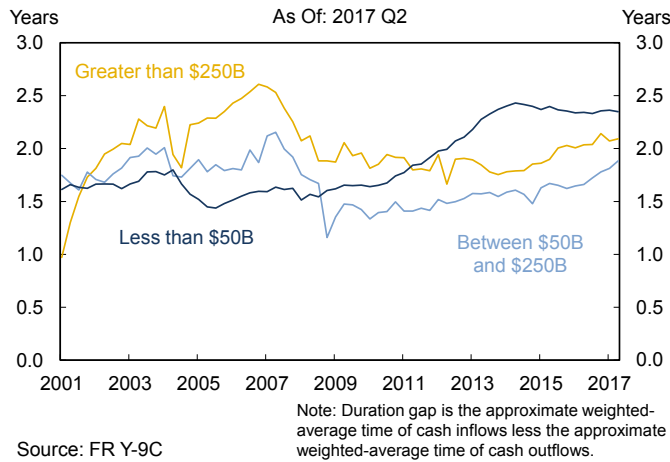
Source: FR Y-9C, FR 2900

### 4.11.14 Selected Liquid Assets at Standard LCR BHCs

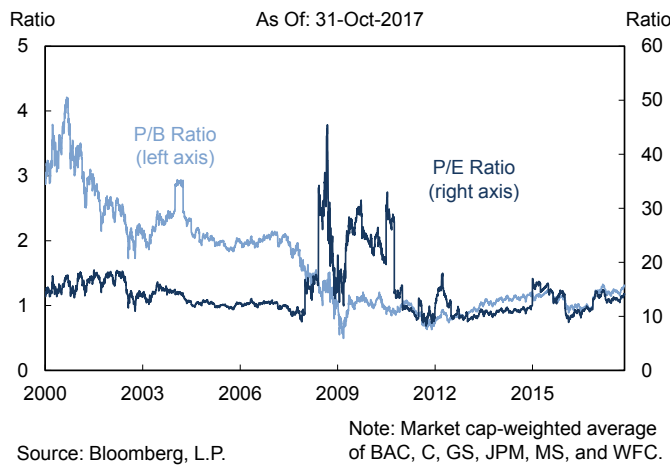


Source: FR Y-9C, FR 2900

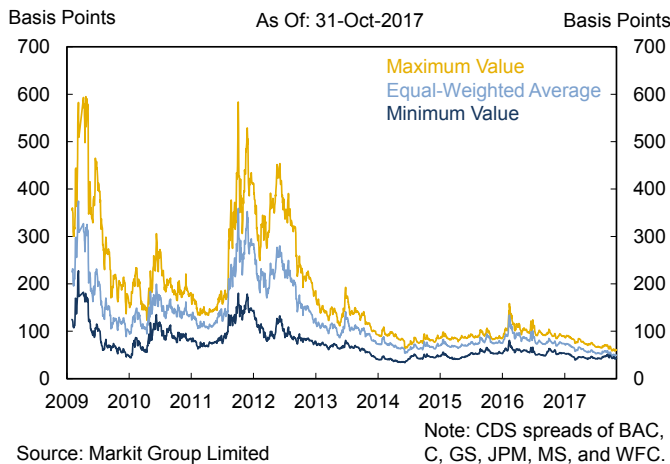
#### 4.11.15 Weighted-Average Duration Gap



#### 4.11.16 P/B and P/E Ratios of Six Large Complex BHCs



#### 4.11.17 CDS Spreads of Six Large Complex BHCs



#### Market Perception of Value and Risk

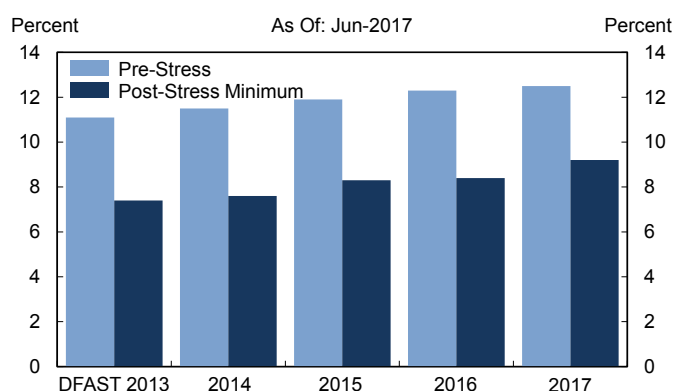
Large BHC equity valuations experienced notable volatility in 2016 and 2017. In February 2016, downward revisions in expected global growth, increased market volatility, lower expected interest rates in the United States, and negative interest rates in Europe and Japan led analysts to mark down substantially their forecasts of bank earnings for 2016. These changes resulted in a 20 percent decline of an asset-weighted index of stock prices of U.S. G-SIBs, about in line with the slump in bank stock prices in Europe and Japan, and greater than the fall in the overall S&P 500 stock index. Bank equity prices increased notably over the second half of 2016, especially following the presidential election in November, and significantly outperformed the broader U.S. stock market. Expectations for higher interest rates, higher fiscal spending, lower corporate taxes, and changes in regulation likely were contributing factors to the rise in equity prices. Even with these recent equity price increases, bank equity valuations as measured by the P/B ratio remained low relative to historical values, with many of the largest BHCs having ratios around or slightly above one (**Chart 4.11.16**). The cost of insuring against credit default risk on long-term debt issued by U.S. G-SIBs remained at very low levels throughout 2016 and 2017, except for a short-lived increase in February 2016 (**Chart 4.11.17**).

## Dodd-Frank Act Stress Tests and Comprehensive Capital Analysis and Review

In June 2016 and June 2017, the Federal Reserve released the results of that year's annual Dodd-Frank Act stress testing (DFAST) and the Comprehensive Capital Analysis and Review (CCAR). Thirty-three BHCs with total consolidated assets of \$50 billion or more participated in the annual stress tests and capital planning review in 2016, and 34 BHCs participated in 2017.

DFAST, a forward-looking exercise conducted by the Federal Reserve, evaluated whether the participating BHCs had sufficient capital to absorb losses over a nine-quarter period resulting from stressful economic and financial market conditions in hypothetical supervisory scenarios designed by the Federal Reserve in consultation with the FDIC and the OCC. These scenarios were also used for company-run stress tests by national banks, state nonmember banks, and federal savings associations with total consolidated assets of more than \$10 billion. As part of DFAST, the banks must report their company-run stress test results to the Federal Reserve, their primary regulator, and the public. The severely adverse scenario used in DFAST 2016 reflected conditions of a severe global recession accompanied by a period of heightened corporate financial stress and negative yields for short-term U.S. Treasury securities. Compared to DFAST 2016, the severely adverse scenario in DFAST 2017 featured a more severe downturn in the U.S. economy with a larger decline in CRE prices and a more severe recession in the euro area and UK. Over the nine quarters horizon of the severely adverse scenario in DFAST 2016, the aggregate projected CET1 ratio for the 33 BHCs fell from 12.3 percent to a minimum level of 8.4 percent. In DFAST 2017, the aggregate projected CET1 ratio for the 34 BHCs fell from 12.5 percent to a minimum level of 9.2 percent, which was still well above the minimum requirement of 4.5 percent (**Chart 4.11.18**).

4.11.18 Initial and Stressed Tier 1 Common Capital Ratios



Note: DFAST 2013-2015 bars depict Tier 1 Common Capital Ratio. DFAST 2016-2017 bars depict Common Equity Tier 1 Ratio.

Source: Federal Reserve

#### 4.11.19 Federal Reserve's Actions in CCAR 2016

Non-Objection to Capital Plan		
Ally Financial	Citizens Financial	MUFG Americas
American Express	Comerica	Northern Trust
BancWest	Discover Financial	PNC Financial
Bank of America	Fifth Third Bancorp	Regions Financial
Bank of New York Mellon	Goldman Sachs	State Street
BB&T	HSBC North America	SunTrust
BBVA Compass	Huntington Bancshares	TD Group U.S.
BMO Financial	JPMorgan Chase	U.S. Bancorp
Capital One Financial	KeyCorp	Wells Fargo
Citigroup	M&T Bank	Zions
Conditional Non-Objection to Capital Plan		
Morgan Stanley		
Objection to Capital Plan		
Deutsche Bank		Santander Holdings USA

Source: Federal Reserve

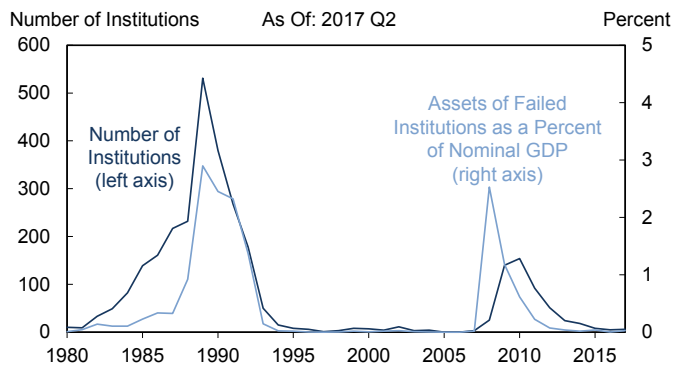
Note: Morgan Stanley's capital plan received a non-objection upon resubmission.

#### 4.11.20 Federal Reserve's Actions in CCAR 2017

Non-Objection to Capital Plan		
Ally Financial	Comerica	MUFG Americas
American Express	Deutsche Bank	Northern Trust
BancWest	Discover Financial	PNC Financial
Bank of America	Fifth Third Bancorp	Regions Financial
Bank of New York Mellon	Goldman Sachs	Santander Holdings USA
BB&T	HSBC North America	State Street
BBVA Compass	Huntington Bancshares	SunTrust
BMO Financial	JPMorgan Chase	TD Group U.S.
CIT Group	KeyCorp	U.S. Bancorp
Citigroup	M&T Bank	Wells Fargo
Citizens Financial	Morgan Stanley	Zions
Conditional Non-Objection to Capital Plan		
Capital One Financial		

Source: Federal Reserve

#### 4.11.21 FDIC-Insured Failed Institutions



Source: BEA, FDIC, Haver Analytics

Note: No FDIC-insured institutions failed during 2005 and 2006. Failed institutions in 2017 through June 30.

Through CCAR, the Federal Reserve evaluates the capital adequacy and the capital planning processes of the 34 BHCs, including the quality of the BHCs' risk management frameworks and the proposed capital actions such as dividend payments and stock repurchases. The Federal Reserve considers both qualitative and quantitative factors in analyzing a firm's capital plan. In 2016, the Federal Reserve issued a conditional non-objection to one BHC, requiring it to correct weaknesses in its capital planning process, which the Federal Reserve did not object to upon resubmission. It also objected to the capital plans of two U.S. subsidiaries of FBOs due to widespread and substantial weaknesses across their capital planning processes (Chart 4.11.19). The Federal Reserve tailored its rules to remove large and noncomplex firms—BHCs and U.S. IHCs of FBOs with total consolidated assets between \$50 billion and \$250 billion, total nonbank assets of less than \$75 billion, and that are not identified as G-SIBs—from the qualitative objection process after 2016. In 2017, the Federal Reserve issued a conditional non-objection to one BHC, requiring it to address weaknesses in its capital planning process (Chart 4.11.20).

#### Insured Commercial Banks and Savings Institutions

At the end of second quarter 2017, the banking industry included 5,787 FDIC-insured commercial banks and savings institutions with total assets of \$17.1 trillion. There were 1,471 institutions with assets under \$100 million and 752 institutions with assets over \$1 billion.

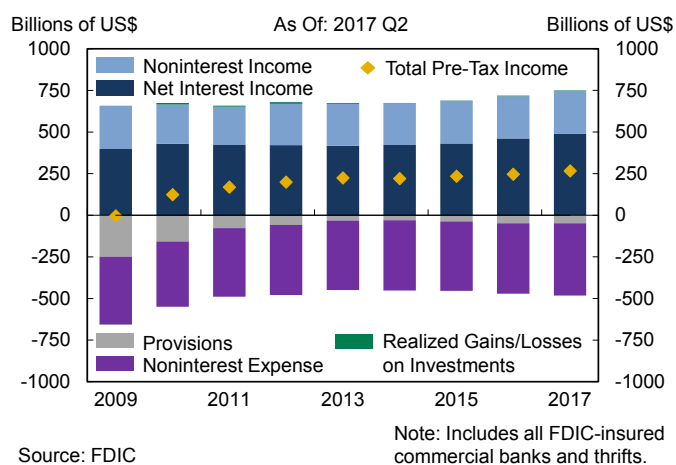
The total number of institutions fell by 269 during 2016 and 126 in the first half of 2017 due to failures and mergers, with there being a total of four new reporters. Failures of insured depository institutions are significantly down since the financial crisis; five institutions with a combined \$277 million in total assets failed in 2016, and six institutions with a combined \$4.9 billion in total assets failed in the first six months of 2017 (Chart 4.11.21).

As of June 30, 2017, 105 institutions—1.8 percent of all institutions—were on the FDIC’s “problem bank” list, compared to 183 problem banks at year-end 2015. Banks on this list have financial, operational, or managerial weaknesses that require corrective action in order to operate in a safe and sound manner.

Since year-end 2015, total assets increased by \$1.1 trillion for all U.S. commercial banks and savings institutions, with total loans and leases increasing by \$619 billion. All major loan categories grew in 2016 and 2017. The largest increases were among C&I loans, loans secured by nonfarm nonresidential real estate, and residential mortgages. Banks increased their investment securities by \$216 billion since year-end 2015, with mortgage-backed securities and U.S. Treasury securities balances up 10.7 percent and 9.9 percent, respectively.

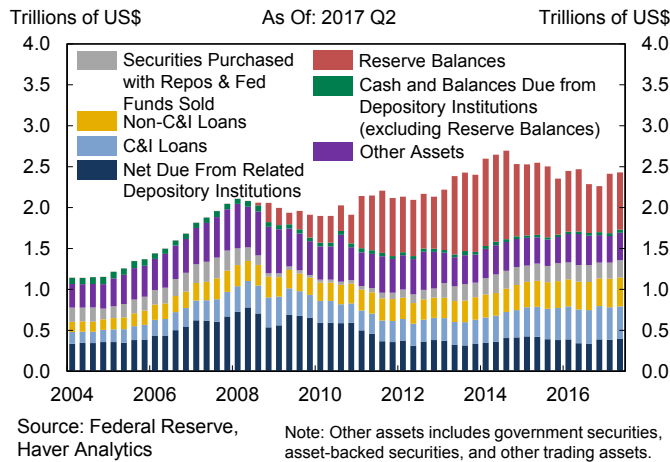
Annualized pre-tax income for all U.S. commercial banks and savings institutions totaled \$267 billion for the first six months of 2017, representing an 8.1 percent increase from 2016, driven in large part by a rise in interest income (**Chart 4.11.22**). Net interest income rose by 8.4 percent for the first six months of 2017 over the first six months of 2016 due to a rise in interest income outpacing a modest rise in interest expense, and interest-earning assets grew 4.0 percent. Almost two-thirds of commercial banks and savings institutions reported higher earnings in second quarter 2017. Credit quality continues to improve as the noncurrent ratio declined to 1.23 percent of total loans. Loan loss provisions decreased 1.1 percent from first half of 2016 as risks to the energy sector and other industries slightly declined.

#### 4.11.22 Commercial Bank and Thrift Pre-Tax Income





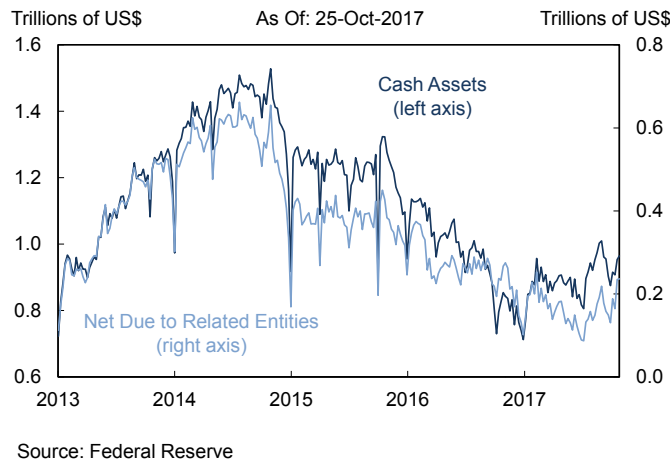
#### 4.11.23 U.S. Branches and Agencies of Foreign Banks: Assets



#### 4.11.2 U.S. Branches and Agencies of Foreign Banks

Assets of U.S. branches and agencies of foreign banks total \$2.4 trillion, about 15 percent of total U.S. banking assets. Aggregate assets held by U.S. branches fell around 4 percent during 2016 before rising 7.4 percent in the first half of 2017 (**Chart 4.11.23**). Aggregate assets are down approximately 10 percent since peaking in the third quarter of 2014. This decrease was largely driven by declining levels of reserves held at the Federal Reserve as branches used a portion of their reserves to pay off liabilities that were not replaced. Even so, some firms continue to have sizable reserve balances, which can function as a liquidity source for some firms in need of additional funding for their U.S. and global operations. Total reserve balances held at the Federal Reserve by depository institutions have declined as shifts in the Federal Reserve’s liabilities have occurred with total liabilities remaining about the same. Cash balances have declined 11 percent since year-end 2015, partially due to regulatory pressures from continued Basel III capital ratio constraints and the SEC’s MMF reform implementation. Cash balances increased modestly in 2017 from December 2016 lows. Cash balances continued to exhibit some quarter-end volatility, likely due in part to efforts to manage balance sheet exposures to meet international quarter-end leverage and liquidity ratio targets (**Chart 4.11.24**).

#### 4.11.24 Cash Assets and Net Due to Related Entities



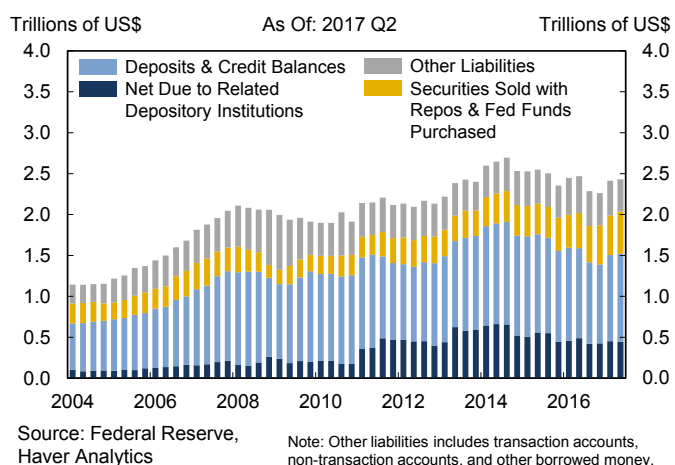
Aggregate loan balances for U.S. branches and agencies of foreign banks was approximately 31 percent of total U.S. branches and agencies of foreign banks assets in the second quarter of 2017, the same as in the fourth quarter of 2015. Total loans peaked in the third quarter of 2016. Aggregate securities at U.S. branches and agencies of foreign banks are 20 percent higher than year-end 2015. This increase was predominantly attributable to a 40 percent increase in U.S. Treasury and agency securities, which stood at \$65 billion as of second quarter 2017. At 40 percent, U.S. Treasury and agency securities now comprise the highest percentage of total securities at U.S. branches and agencies

since more granular securities data were first reported in second quarter 2001. U.S. Treasuries are a primary source of contingent liquidity, along with reserve balances. Some firms increased their U.S. Treasury holdings over the course of 2016 as they sought to comply with the liquidity stress testing requirements of the enhanced prudential standards for foreign firms with combined U.S. assets greater than \$50 billion, which came into effect on July 1, 2016.

The funding profiles of some U.S. branches and agencies of foreign banks have changed since the financial crisis. Aggregate liabilities declined in 2016, due mainly to reductions in deposit and credit balances, but in 2017 deposit and credit balances turned up and aggregate liabilities increased (**Chart 4.11.25**). Foreign branches' net "due to" position declined in 2016 (meaning that foreign branches' liabilities owed to parents and other related entities declined) before a modest increase in the first half of 2017. Net "due to" positions are lower than their peak in 2014, as foreign branches have used cash balances to pay off excess funding from their head offices.

Despite the general trend in the shift in net due to positions, certain predominantly non-European firms saw an increase in individual net due to positions in 2016 as they borrowed funds from head offices and non-U.S. branches to replace lost wholesale funding prior to MMF reform implementation, which took effect on October 14, 2016. The funding shift post-MMF reform occurred in an orderly manner, suggesting that FBOs were able to sufficiently meet funding needs even as a large amount of MMF AUM shifted from prime to government MMFs. As reserve balances at the Federal Reserve and wholesale short-term funding have been reduced, foreign banks have diversified their sources of dollar funding. In 2016, the UK referendum to exit the EU did not result in long-term funding impacts to FBO firms.

#### 4.11.25 U.S. Branches and Agencies of Foreign Banks: Liabilities



The additional capital, leverage, liquidity, and reporting requirements of the IHCs which went into effect last year may have created incentives for FBOs to change their U.S. legal structures, alter business focus, and shift assets away from non-branch entities. Throughout 2016, several firms experienced material declines in their broker-dealer assets, explicitly shrinking or managing non-branch assets below \$50 billion to avoid the requirement to establish an IHC. Relatedly, certain assets and liabilities, notably securities purchased or sold with repos, have grown as several firms have migrated these activities away from the broker-dealer to the U.S. branches and agencies, which are subject to less stringent requirements than IHCs.

#### **4.11.3 Credit Unions**

Credit unions are member-owned, not-for-profit, depository institutions. As of the second quarter of 2017, there were 5,696 federally insured credit unions with aggregate assets of nearly \$1.4 trillion. Almost three quarters of credit unions had assets under \$100 million, with nearly 30 percent having less than \$10 million in assets. There were 1,284 credit unions with assets between \$100 million and \$1 billion, and 282 credit unions with assets over \$1 billion.

Consolidation continued during 2016 and the first half of 2017, particularly at smaller institutions. The number of credit unions with less than \$50 million in assets fell to 3,398 in the second quarter of 2017, bringing the cumulative decline over the past five years to more than 28 percent. At the same time, however, industry assets grew more than 8 percent on an annualized basis during 2016 and the first half of 2017. Membership in federally insured credit unions grew more than 17 percent over the past five years, reaching 109 million members as of second quarter of 2017.

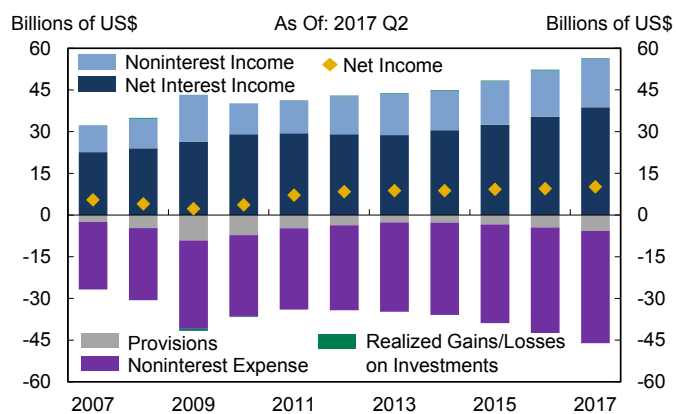
Financial performance at credit unions generally improved during 2016 and the first half of 2017, at least partly reflecting an improving economy and rising loan demand. Net income at consumer credit unions

increased to more than \$10 billion on an annualized basis as of second quarter 2017, an increase of 17.1 percent from 2015 (Chart 4.11.26). The amount of outstanding loans at credit unions increased by 10.6 percent on an annualized basis during 2016 and the first half of 2017, a slight decline from the 10.7 percent pace registered during 2015. Credit union first mortgage loans grew 10.1 percent on an annualized basis during 2016 and the first half of 2017. A recent NCUA analysis of the 2015 Home Mortgage Disclosure Act (HMDA) data suggests mortgages originated by credit unions are typically smaller than loans made by other financial institutions. On a county-by-county basis, mortgages originated by credit unions are roughly 15 percent smaller than mortgages originated by other financial institutions and accounted for about 12 percent of residential mortgages originated in 2015.

The credit union system achieved return on average assets (ROAA) of 77 basis points in 2016, little changed from 75 basis points in 2015. Interest and non-interest income rose, and the NIM among all credit unions edged up to 2.88 percent of average assets in 2016 from 2.85 percent in 2015. The NIM among all credit unions has narrowed by roughly 40 basis points from its recent high at year-end 2010.

In October 2017, the NCUA Board closed the Temporary Corporate Credit Union Stabilization Fund (TCCUSF) and merged its remaining assets into the National Credit Union Share Insurance Fund. The TCCUSF was created in May 2009 to resolve five failed corporate credit unions and provide short-term and long-term funding for the failed institutions' portfolios of residential MBS, commercial MBS, other asset-backed securities, and corporate bonds. The TCCUSF contained the costs of the failed corporate credit unions within the credit union system and accumulated a surplus predominantly due to the success with legal recoveries.

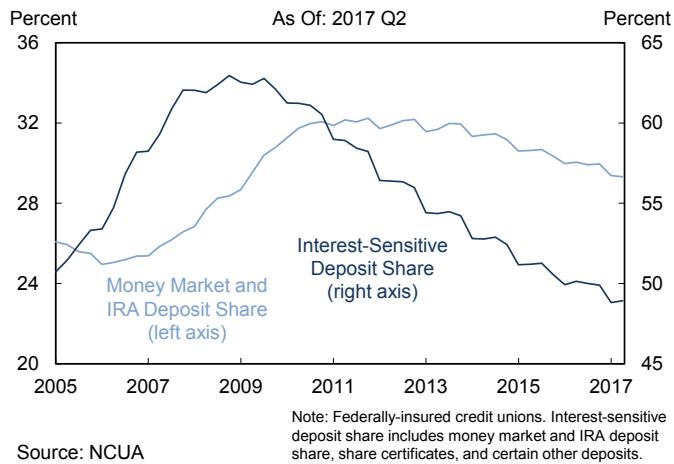
#### 4.11.26 Credit Union Income



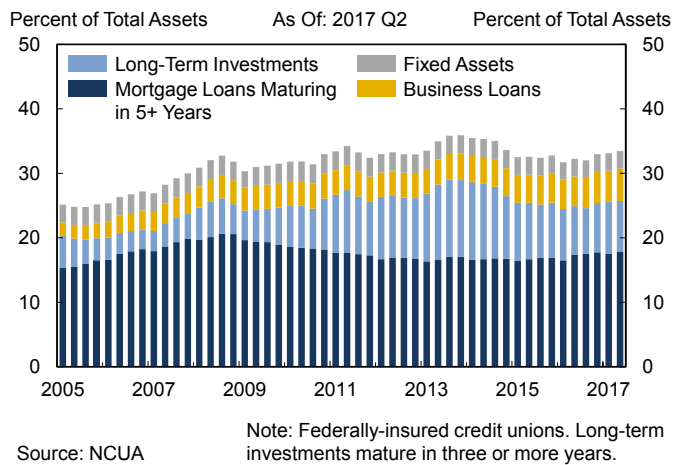
Source: NCUA

Note: Federally-insured credit unions.

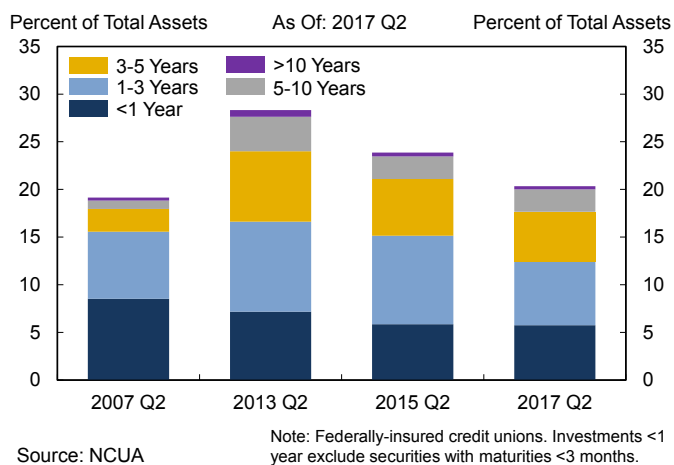
#### 4.11.27 Credit Union Deposits



#### 4.11.28 Credit Union Net Long-Term Assets



#### 4.11.29 Credit Union Investments by Maturity



Credit unions continue to contend with interest rate risk, given the low interest rate environment and potential transition to a higher rate environment with a flatter yield curve. Many credit unions reduced their exposure to interest rate risk in 2016, though interest rate risks remain. Although interest-sensitive deposits continue to decline as a share of total liabilities and are nearing pre-crisis levels, the share of money market accounts and individual retirement account (IRA) deposits remains elevated (Chart 4.11.27). Net long-term assets slightly increased during 2016 and the first half of 2017 and remain high relative to the pre-crisis period (Chart 4.11.28). Having exhausted other sources of earnings growth, some credit unions appear to be continuing to search for yield by lengthening their term of investments to boost near-term earnings, though the effect appears to be diminishing.

Investments in total as a share of assets have edged down since 2013, falling from 28.3 percent of assets to 20.3 percent as of second quarter 2017. The downward trend in investments as a share of assets at least partly reflects substitution toward lending as loan demand increased. Investments as a share of assets is similar to where it stood in second quarter 2007. The share of investments with maturity greater than three years fell from 11.7 percent of assets in the second quarter of 2013 to 7.9 percent as of second quarter of 2017, but is still higher than in second quarter 2007, when the share was 3.6 percent (Chart 4.11.29).

Although credit unions' close ties to specific geographies or business organizations offer certain advantages, localized economic distress can present these institutions with certain unique challenges. Two U.S. industries that highlight potential concentration of risk are energy and transportation. The fall in the price of oil since 2014 has led to a decline in investment and increased layoffs in energy companies, leading to strains on the credit unions exposed to the sector. In addition, credit unions exposed to the taxicab industry have experienced stress following increased

competition from ridesharing companies and a decline in demand for traditional taxi services. As of the second quarter of 2017, there were seven credit unions with significant member ties to the taxi industry with \$3.0 billion in taxi medallion loans either on their balance sheets or sold to other credit unions. Two credit unions with total assets of more than \$1.5 billion and specializing in taxi medallion loans were placed into conservatorship in the first half of 2017.

## 4.12 Nonbank Financial Companies

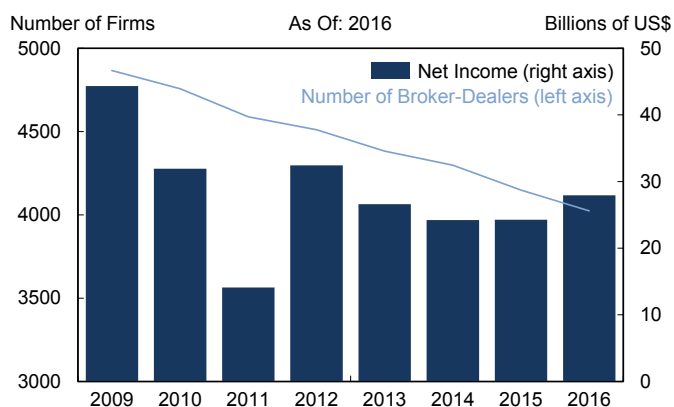
### 4.12.1 Securities Broker-Dealers

As of June 2017, there were approximately 4,000 securities broker-dealers registered with the SEC, a decline of 5 percent from year-end 2015. The number of broker-dealers registered with the SEC has declined steadily since 2009, mainly due to consolidation (**Chart 4.12.1**). Aggregate net income in the sector increased by approximately \$3.6 billion in 2016 due to increasing revenues, but remains significantly below the 2009 level (**Chart 4.12.2**). Aggregate net income in the first half of 2017 was \$19.2 billion with total revenues of \$152 billion.

The U.S. broker-dealer sector remains relatively concentrated; approximately 60 percent of industry assets were held by the top ten broker-dealers as of June 2017. The concentration of the largest broker-dealers has remained fairly constant over the past several years. Assets held within the U.S. broker-dealer industry decreased to \$3.9 trillion in 2016 before rising to \$4.2 trillion in the first half of 2017, but remain well below the peak of \$6.8 trillion in 2007 (**Chart 4.12.3**).

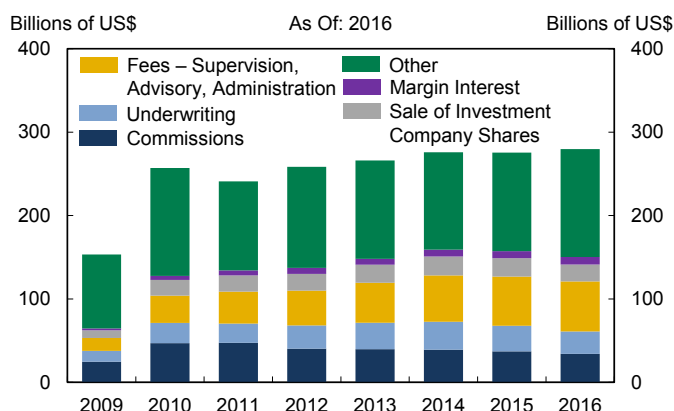
Broker-dealers typically obtain leverage through the use of short-term secured financing arrangements, such as repos and securities lending transactions. Broker-dealer leverage, measured in various ways, has also declined markedly since the crisis. The leverage ratio at broker-dealers, measured as total assets over owner's equity, remained largely unchanged at

### 4.12.1 Number of Broker-Dealers and Industry Net Income



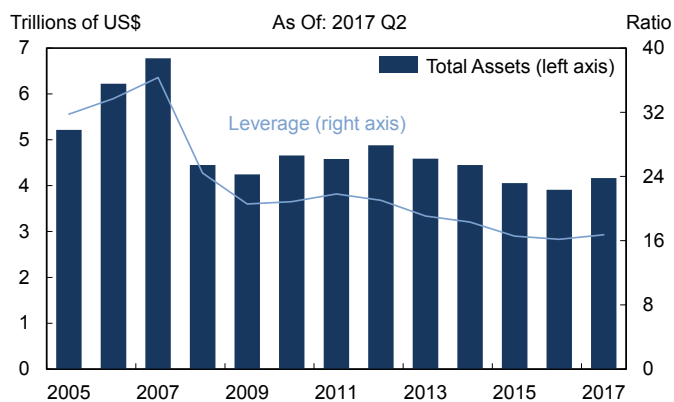
Source: FINRA

### 4.12.2 Broker-Dealer Revenues



Source: FINRA

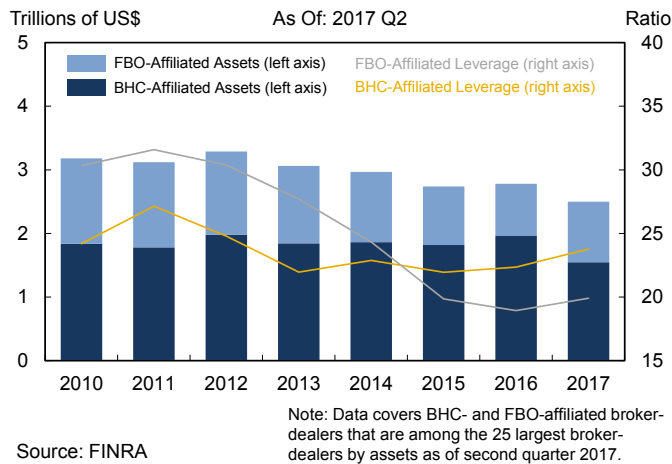
### 4.12.3 Broker-Dealer Assets and Leverage



Source: FINRA

Note: Leverage is the ratio of total assets to total ownership equity. 2017 data as of second quarter 2017.

#### 4.12.4 Large Broker-Dealer Assets and Leverage by Affiliation



17 in aggregate as of June 2017, well below the peak of 36 as of year-end 2007.

Most of the largest U.S. broker-dealers are affiliated with U.S. BHCs or FBOs. Among the twenty-five largest U.S. broker-dealers, seven are affiliated with BHCs and twelve with FBOs. Among large broker-dealers, aggregate assets for broker-dealers affiliated with BHCs increased in 2016 and the first half of 2017, while aggregate assets for broker-dealers affiliated with FBOs increased during the first half of 2017 after multi-year declines. BHC-affiliated broker-dealers had an aggregate leverage ratio of 24 as of second quarter 2017, while FBO-affiliated broker-dealers had an aggregate leverage ratio of 20 (Chart 4.12.4).

Since the crisis, broker-dealers have relied more heavily on unsecured financing from their parent companies and affiliates. Broker-dealer financing activity through repo agreements has declined 27 percent between 2012 and June 2017. Broker-dealers seek to address liquidity risk associated with short-term securities financing liabilities by requesting high quality liquid collateral and extending weighted-average maturities (WAM) of repo transactions. A broker-dealer's short-term liabilities are typically supported by a very liquid asset base such as U.S. Treasury securities, as well as agency debt and MBS. For the largest broker-dealers, the WAM of repo for very liquid products was approximately one month as of June 2017. Less liquid assets such as high-yield debt are typically financed through term-secured financing arrangements, capital, or long-term lending from the parent company. For the largest broker-dealers, the WAM of repo for less liquid assets was in excess of three months as of June 2017.

#### 4.12.2 Insurance Companies

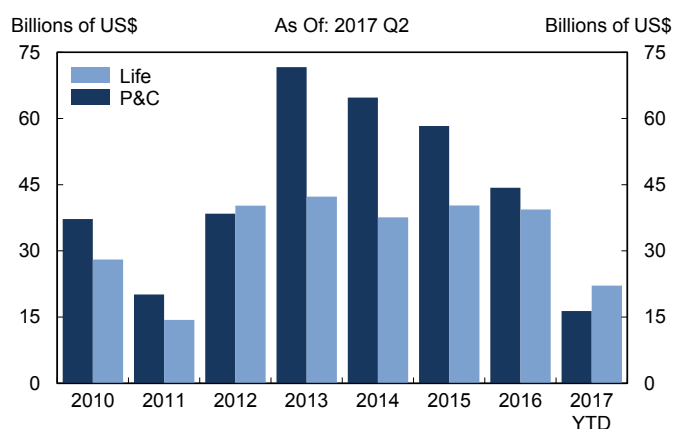
Net income among life insurers has remained generally unchanged, having fallen slightly in 2016 and risen moderately in the first half of 2017 (**Chart 4.12.5**). Higher catastrophe losses drove net income lower among property and casualty (P&C) insurers, with net income down 24 percent in 2016, and down 29 percent year-over-year in the first half of 2017.

Market share of the ten largest life insurers ticked lower in 2016, as direct premiums and annuity considerations at these firms fell from 54.7 percent of the industry total to 52.9 percent. The ten largest P&C insurers constituted 46.5 percent of direct premiums written in 2016, up from 45.6 percent in 2015. Insurers have also reported some degree of a shift in product sales in recent years. For instance, sales of fixed annuities, in which life insurers guarantee a fixed interest rate for the annuitant, have partly replaced sales of variable annuities, in which benefits fluctuate with the performance of underlying investments.

Insurance companies continued to cite the low interest rate environment as a driver of lower investment income and thus a headwind to profitability, although heightened expectations for future interest rate increases towards the end of 2016 helped improve their stated outlook for the industry. Insurers' net yields on invested assets have declined in recent years and remain at low levels (**Chart 4.12.6**).

As interest rates have remained low over the past several years, insurers have increased general account investment exposures to certain asset classes in order to capture higher expected yields. Among life insurers in 2016 and the first half of 2017, investments in mortgage loans increased 14.2 percent, and those in common stocks increased 22.4 percent, as total cash and investments overall increased 7.6 percent. Certain other net admitted investments, which include nontraditional securities, increased 9.7 percent, having generally outpaced growth in investments overall in recent prior years.

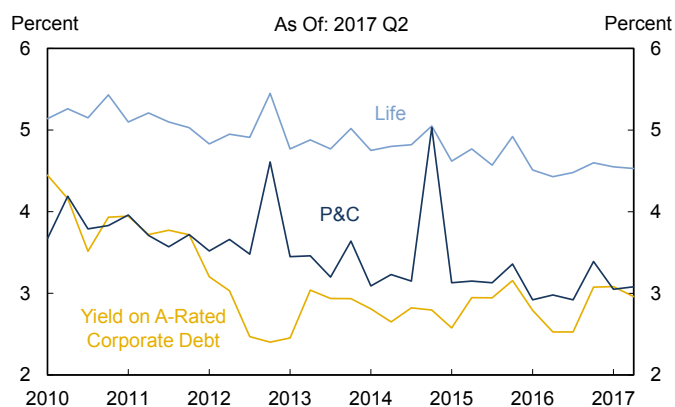
#### 4.12.5 Insurance Industry Net Income



Source: SNL Financial

Note: Life includes accident and health.

#### 4.12.6 Net Yield on Invested Assets

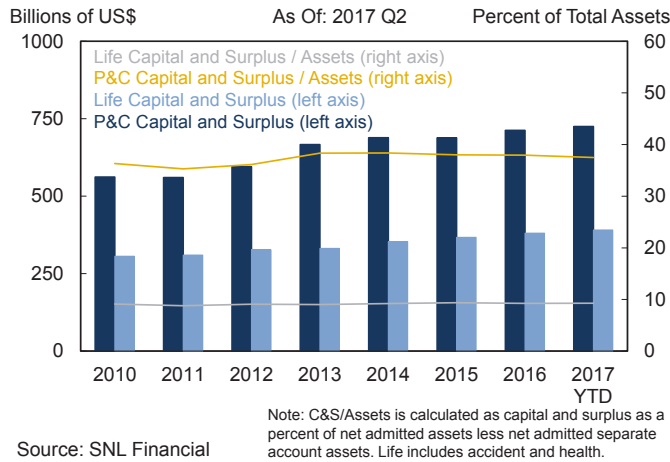


Source: SNL Financial, Bank of America Merrill Lynch, Haver Analytics

Note: Life includes accident and health.



#### 4.12.7 Insurance Industry Capital and Surplus

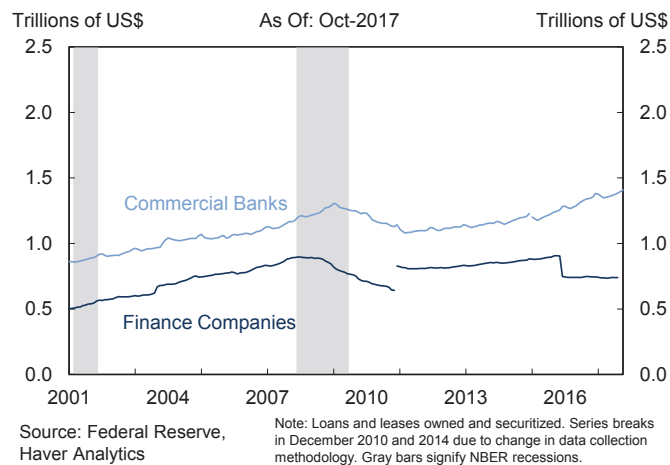


Bonds remain the primary investment allocation for both life and P&C insurers, with the ratio of bonds to total cash and investments at 73 percent among life insurers and 60 percent among P&C firms as of mid-2017. Capital and surplus as a percent of total assets has remained generally unchanged over the past few years at life and P&C insurers (**Chart 4.12.7**).

#### 4.12.3 Specialty Finance

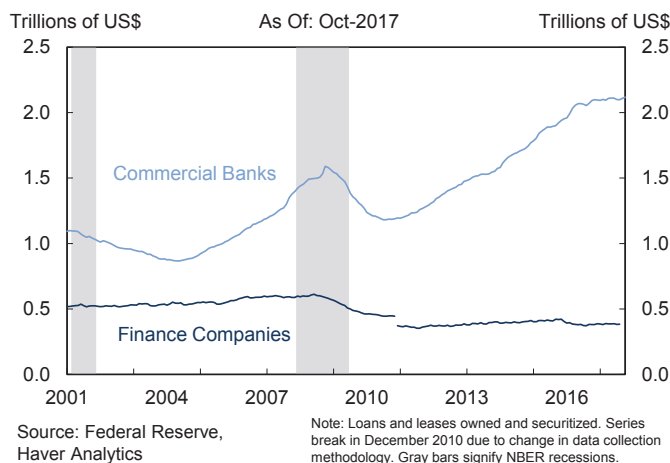
Although outstanding consumer and business loans from commercial banks increased in 2016 and 2017, loans from specialty finance companies were generally flat over this period. Specialty finance companies are non-depository institutions that provide loans to consumers and businesses. Specialty finance companies held approximately \$739 billion of consumer loans and leases and \$384 billion of business loans and leases as of August 2017 (**Charts 4.12.8, 4.12.9**). Specialty finance companies' ownership of real estate loans and leases declined in 2016 and 2017 and remains well below its pre-crisis peak.

#### 4.12.8 Consumer Loans and Leases Outstanding



While specialty finance companies trail commercial banks in overall consumer lending volume, these firms do maintain an outsized market share in certain types of activity. Amid surging auto loan growth, for example, specialty finance companies originated 48 percent of total auto loans in the first half of 2017, a slight decline from the 51 percent recorded during 2016. These firms, however, accounted for 71.7 percent and 72.6 percent of subprime auto loan originations, respectively, in those periods—well above the subprime lending market share of banks and credit unions. As opposed to banks, which generally have more stable sources of funding such as deposits, specialty finance companies rely to a higher degree on wholesale funding and the securitization market.

#### 4.12.9 Business Loans and Leases Outstanding



Total asset-backed security (ABS) issuance was approximately \$322 billion in 2016, which

was a slight decline from 2015 issuance (**Chart 4.12.10**). As of October of 2017, issuance has totaled \$391 billion, a 52 percent increase compared to the same period in 2016.

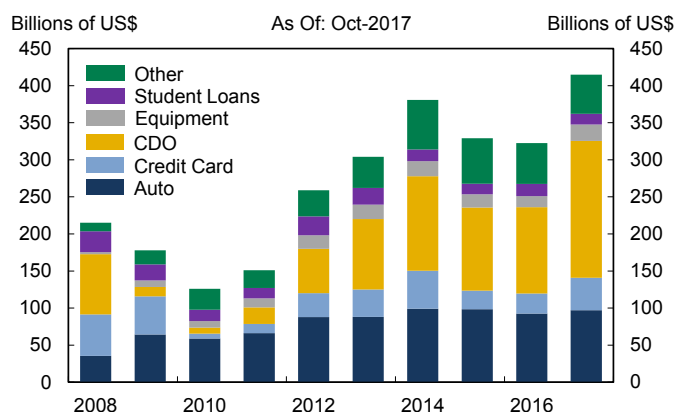
After rapid growth in issuance over the past few years, auto ABS issuance fell 6 percent in 2016 to \$92 billion. Auto ABS issuance totaled \$87 billion through October of 2017, roughly the same as over the same period in 2016. Credit card ABS issuance increased 9 percent in 2016 as more credit card companies returned to the ABS market. This trend continued through October of 2017, as credit card companies took advantage of tight credit card spreads in the ABS market in a rising rate environment. Compared to the same period in 2016, credit card ABS issuance has grown by 55 percent.

Overall, the heightened market volatility in the first half of 2016 had a negative impact on ABS issuance as ABS spreads generally widened to multiyear highs (**Chart 4.12.11**). The impact was amplified for products that are subject to relatively higher credit risk, such as subprime auto ABS. However, the impact on plain-vanilla ABS products, such as credit card ABS, was more muted. The issuance resumed as the markets stabilized, and credit spreads tightened rapidly in the second half of 2016 and early 2017.

#### 4.12.4 Agency REITs

During 2016, listed agency REIT assets—which consist mainly of agency MBS—fell 3.8 percent to \$249 billion, the lowest level since mid-2011 (**Chart 4.12.12**). During the first half of 2017, assets have been steady around \$250 billion. The market remains concentrated with over 50 percent of the share within two REITs. While total sector assets have steadily declined from a peak of \$414 billion in 2012, leverage, as measured by the ratio of total assets to equity, has remained relatively constant in recent years. It has fluctuated between 6.7 and 7.2 since 2014, and is well below pre-crisis levels of 10.0 to 12.0. Most individual agency REITs maintain leverage ratios between 4.0 and 8.0, though some recorded ratios as high as 11.0 in 2016.

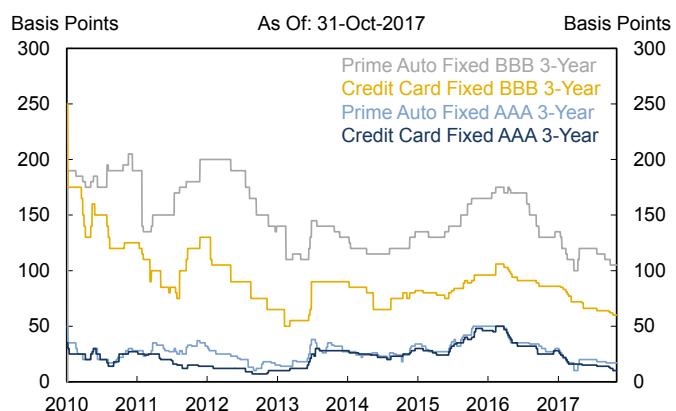
#### 4.12.10 ABS Issuance



Source: Thomson Reuters, SIFMA

Note: 2017 data is year-to-date.

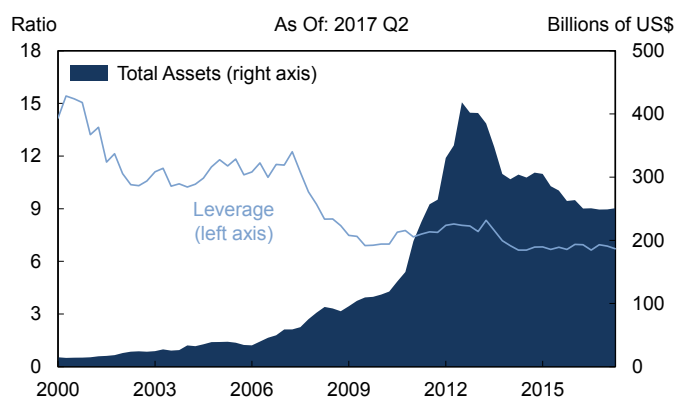
#### 4.12.11 Selected ABS Spreads



Source: J.P. Morgan

Note: Spreads to swaps.

#### 4.12.12 Agency REIT Assets and Leverage



Source: Bloomberg, L.P.

Note: Leverage is the ratio of total assets to equity. Not all agency REITs existed in all time periods in the figure.

#### 4.12.13 Agency REIT Price-to-Book Ratio



Share prices of agency REITs largely increased over 2016 and the first half of 2017 alongside broad gains in domestic equity markets, retracing much of the substantial declines in sector share prices in 2015. Because of the strong equity price performance, the aggregate P/B ratio for agency REITs increased, rising from 0.78 to 1 in June 2017 (**Chart 4.12.13**). Prior to this recovery, the sector had experienced an aggregate P/B ratio below 1.00 for 16 consecutive quarters dating back to mid-2013.

In 2016, agency REITs largely benefitted from a steepening of the Treasury yield curve in the fourth quarter and a measured increase in U.S. dollar LIBOR through the second half of the year. Because agency REITs earn income by purchasing longer-dated agency MBS through shorter-term borrowing in the repo market, they are typically able to generate larger profits when the yield curve steepens. While the yield curve did steepen in late 2016, it remains flatter than has been the case for most of the post-crisis period. The increase in U.S. dollar LIBOR, largely attributed to lower demand for bank-issued CP and CDs resulting from recent MMF reforms, also tends to benefit agency REITs. This is because they typically hedge using interest rate swaps in which they receive payments tied to LIBOR. When LIBOR rises faster than their repo financing costs, they are able to generate higher profits. However, while LIBOR did rise over the course of 2016, it remains well below its historical average.

Finally, most agency REITs have terminated their use of advances from the FHLBs as a source of funding in response to the FHFA's amendment of the eligibility criteria for FHLB membership in early 2016. No agency REITs have reported material disruptions in the overall availability of funding following this development.

## 4.13 Investment Funds

### 4.13.1 Money Market Mutual Funds

Net assets held by MMFs fell 4 percent to \$3.0 trillion in 2016, remaining close to the industry's five-year average. Net AUM remained generally unchanged over the first ten months of 2017. The number of MMFs continued to decline—by 89 in 2016 and by 14 over the first ten months of 2017—to a total of 399.

As of October 2017, the five largest MMF complexes managed 51 percent of all MMF assets, up from 46 percent at the end of 2015, and the ten largest advisors managed 75 percent of all assets, up from 71 percent at the end of 2015.

MMF yields increased in 2016 and 2017 along with U.S. short-term interest rates. Having instituted fee waivers in recent years to prevent yields from entering negative territory, MMF advisors reduced these waivers in 2016 as rates increased. From 2015 year-end to October 2017, net yields offered by prime MMFs increased from 22 basis points to 109.

The MMF industry experienced significant changes in 2016 and early 2017 as MMF reforms came into effect. Reforms led to lasting changes in the composition of MMF assets, as well as temporary changes in liquidity and maturity profiles, money market-sensitive interest rates, and several other aspects of the industry (**see Box C**).

## Box C: Market Response to Money Market Mutual Fund Reforms

The MMF industry experienced significant structural changes in 2016 and 2017, largely due to the implementation of SEC reforms. The reforms led to a significant shift in the composition of fund assets and impacted certain funding markets.

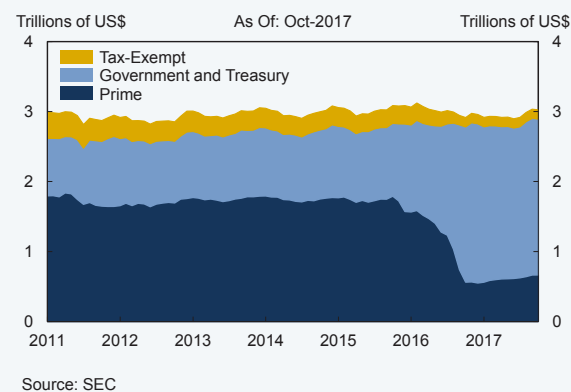
The reforms, which were fully implemented as of October 2016, were instituted to mitigate the risk of investor runs on MMFs, following runs experienced in 2008. The reforms mandated that institutional prime and tax-exempt MMFs, which invest primarily in financial and nonfinancial corporate short-term debt instruments and municipal securities, respectively, price their shares based on the market values of their assets rather than on amortized cost. The reforms also required that prime and tax-exempt MMFs for both institutional and retail customers establish tools to enable funds' boards of directors to impose liquidity fees and redemption gates under certain conditions. Unlike these fund types, government MMFs, which invest primarily in U.S. Treasury and agency securities, as well as in repo collateralized by such securities, may continue to maintain a stable net asset value (NAV) and are not required to be able to impose redemption fees and restrictions.

### Asset Composition

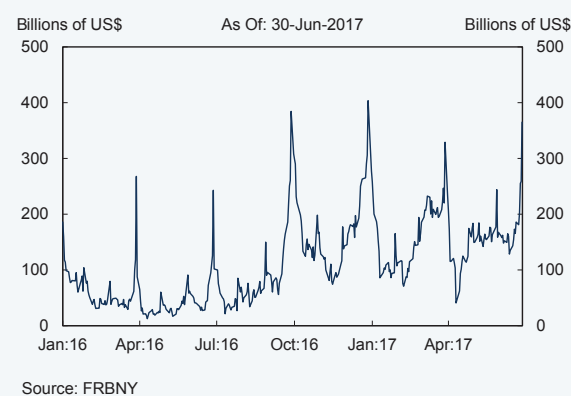
Due largely to the implementation of reforms, assets in prime and tax-exempt MMFs declined sharply and shifted to government MMFs. Approximately \$1 trillion in assets shifted from prime to government MMFs through either fund conversions or investor reallocation, driven mostly by institutional investors and intermediaries, including broker-dealer sweep accounts. As of October 2017, prime MMFs held 22 percent of industry assets, down from 51 percent at 2015 year-end, and government MMFs held 74 percent of industry assets, up from 41 percent at 2015 year-end (**Chart C.1**).

The shift toward government MMFs led to stronger demand for government fund-eligible assets, including Treasury and agency securities, private market repo collateralized by government securities, and repo conducted through the Federal Reserve's ON RRP facility. MMF participation in the ON RRP facility increased in the weeks leading up to the reform implementation date, coinciding with the acceleration of outflows from prime funds and inflows into government funds. Participation remained elevated through the reform implementation date compared to average levels seen earlier in 2016 (**Chart C.2**).

C.1 MMF Assets by Fund Type



C.2 ON RRP Take-Up by MMFs

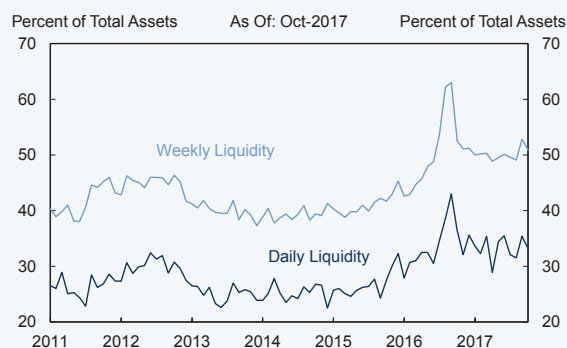


### Liquidity

MMF reform implementation also led to shifts in prime MMFs' liquidity positions in 2016 and 2017. Prime MMFs' daily liquidity – the share of assets that are convertible to cash within one business day—increased from 32 percent at 2015 year-end to 43 percent in September 2016, as prime MMFs anticipated redemptions near the October compliance date. Daily liquidity fell sharply after the reform implementation date as redemptions stabilized, reaching 33 percent by October 2017. The share of assets convertible to cash within five business days exhibited a similar pattern (**Chart C.3**).

Market participants noted that in order to position for potential outflows ahead of the reform implementation date, institutional prime fund managers invested more in shorter-duration assets, resulting in a temporarily lower WAM of their portfolios. The decrease in WAMs contributed to a temporary decline in institutional prime fund yields.

**C.3 Liquid Asset Shares of Prime MMFs**



Source: SEC

Note: Weighted by fund size.

### Impact on Funding

Money market-related interest rate spreads also experienced high volatility over 2016 and 2017. According to market participants, the significant reduction in demand from prime MMFs and shortening of WAMs contributed to a sharp

rise in unsecured bank borrowing rates ahead of the reform implementation date, as prime MMFs historically have been a major source of short-term lending to banks. Unsecured bank borrowing rates, such as U.S. dollar LIBOR and financial CP and negotiable CD rates, rose notably ahead of the reform implementation date absent any meaningful change in perceived credit conditions. The three month LIBOR-OIS spread, one measure of the cost of unsecured interbank lending, rose by about 15 basis points to a high of 43 basis points during the third quarter of 2016 (**Chart C.4**). This increase was temporary, however. Spreads have since declined to 2015 year-end levels as banks have utilized alternative funding sources, including other types of investment funds.

The dollar amount of CP owned by prime MMFs fell 65 percent from June 2014, just prior to the publication of the reform rule, to December 2016. As a percentage of total CP outstanding, prime MMFs' holdings of CP fell from 42 percent to 17 percent over this period. Total CP outstanding declined only 12 percent, indicating that borrowers were able to attract other investors into the CP and CD markets (**see Section 4.9.1**). Although MMFs retraced some of the decline in CP and CD holdings in 2017, the amount of these holdings remains well below levels witnessed before the reform implementation.

### Tax-Exempt MMFs

Tax-exempt MMFs also saw outflows of over \$100 billion ahead of the reform implementation date, equivalent to roughly 40 percent of AUM. The SIFMA Municipal Market Swap Index, a weekly measure of the average 7-day interest rate on certain high-grade municipal debt, increased from 1 basis point in early 2016 to a peak of 87 basis points shortly ahead of the reform implementation date. Market participants attributed the increase in part to reduced demand for this debt from tax-exempt MMFs. The SIFMA index subsequently retraced some of this increase before rising again in late 2016 and 2017 with other short-term interest rates.

### Post-Implementation

Reform implementation did not appear to result in any immediate material disruptions to market liquidity conditions in U.S. money markets. Following the reform implementation date, government and prime fund AUM steadied, and participation in the ON RRP facility remained elevated in late 2016. Market participants noted that higher government fund AUM led to stronger demand for U.S. Treasury and agency repo. In 2017, government funds further increased repo holdings as repo dealers increased supply, leading to lower participation in the ON RRP facility relative to late 2016.

Total prime fund AUM stabilized following the reform implementation date and was little changed through year-end. In 2017, prime fund AUM increased slightly, leading to larger holdings of financial CP and CDs, although balances still remain well below pre-reform levels. Institutional prime fund WAMs began to increase after the implementation date as reform-related outflows stopped and as fund managers were better able to forecast investor redemption demand. The three-month LIBOR-OIS spread fell from post-reform highs and retraced by the first half of 2017 to levels below those prevailing in early 2016.

### C.4 LIBOR-OIS Spread



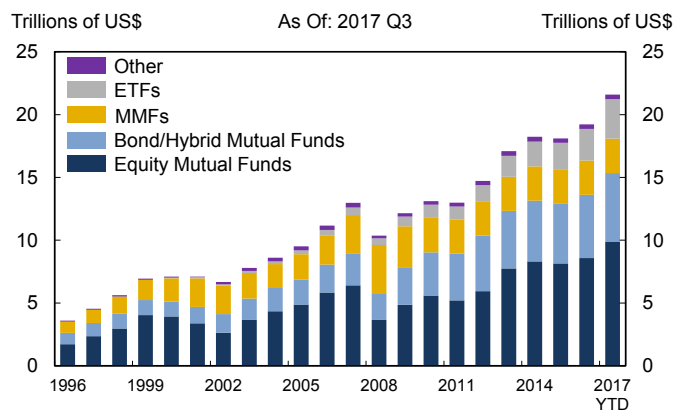
Source: Bloomberg L.P.

### 4.13.2 Mutual Funds

The AUM of the U.S. mutual fund industry, which includes equity and bond/hybrid funds, grew 19 percent over 2016 and the first three quarters of 2017 to \$15.3 trillion, constituting approximately 71 percent of total U.S. investment company AUM (Chart 4.13.1). The recent growth in mutual fund AUM can be attributed to capital appreciation, as the industry experienced approximately \$100 billion of cumulative net outflows over this period.

Mutual funds recorded net cash outflows for most months of 2016, with bond/hybrid fund inflows offset by larger outflows from equity funds. Total net outflows peaked in the fourth quarter, as bond funds experienced outflows following a rally in risk assets (Charts 4.13.2, 4.13.3). In late 2016, municipal bond funds experienced their largest outflows since 2013, as investors withdrew money due to expectations of future tax cuts, which could diminish the value of preferential tax treatment of municipal bonds, and an increase in municipal bond supply. In the first ten months of 2017, equity funds witnessed smaller outflows than in 2016, while inflows into bond funds grew stronger.

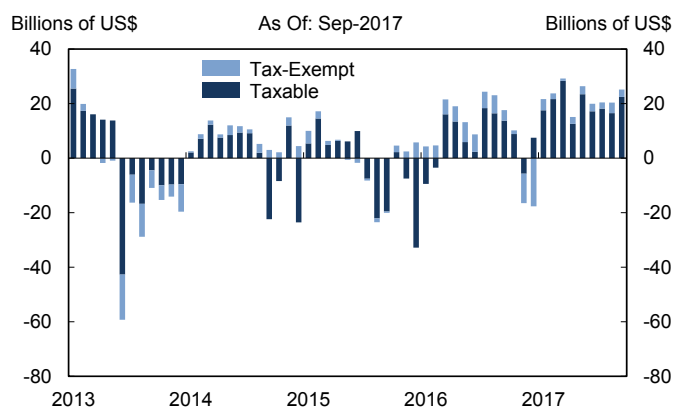
### 4.13.1 Net Assets of the Investment Company Industry



Source: ICI, Haver Analytics

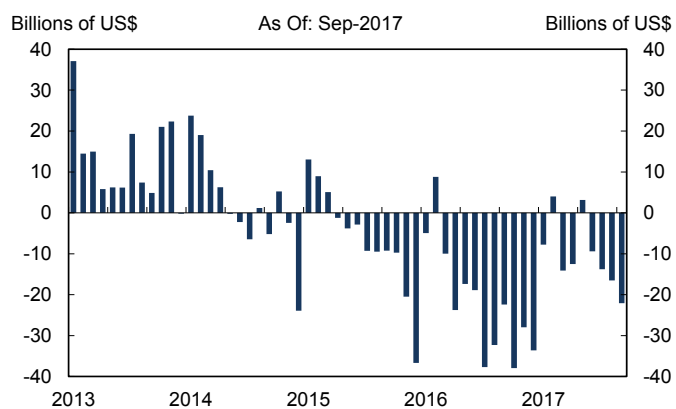
Note: Other is composed of unit investment trusts and closed-end funds. 2017 YTD figures include 2016 UIT data, which is reported annually.

### 4.13.2 Monthly Bond Mutual Fund Flows



Source: ICI, Haver Analytics

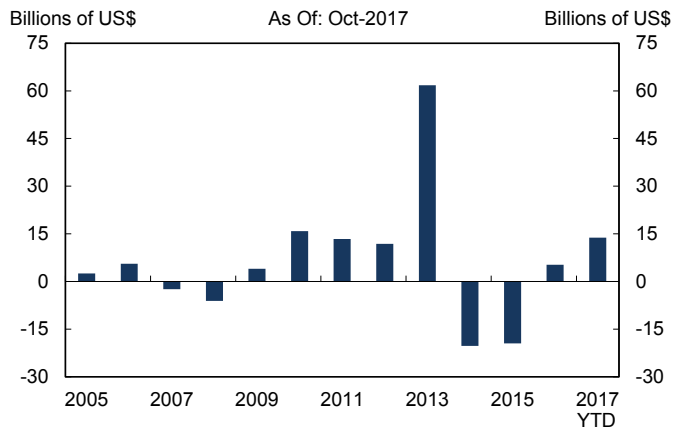
### 4.13.3 Monthly Equity Mutual Fund Flows



Source: ICI, Haver Analytics

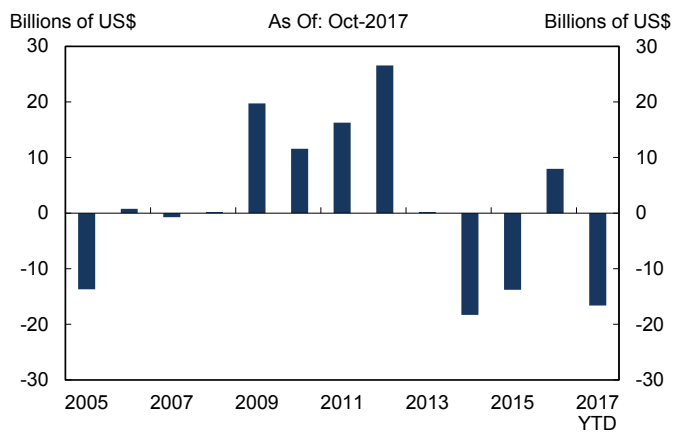


#### 4.13.4 Bank Loan Mutual Funds: Annual Flows



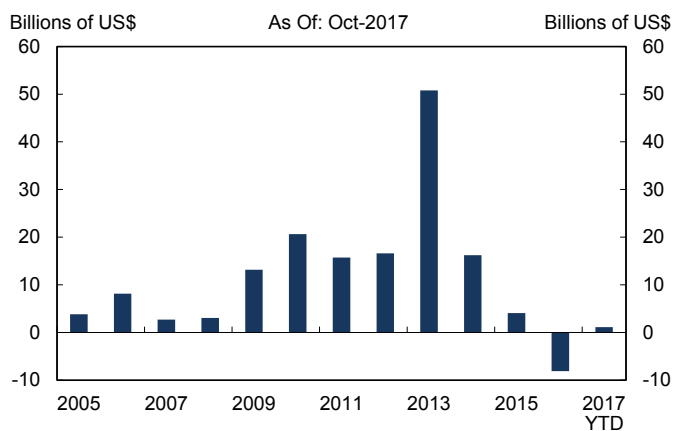
Source: Morningstar, Inc.

#### 4.13.5 High-Yield Mutual Funds: Annual Flows



Source: Morningstar, Inc.

#### 4.13.6 Alternative Mutual Funds: Annual Flows



Source: Morningstar, Inc.

Bank loan and high-yield mutual funds experienced mixed flows in 2016 and the first ten months of 2017, following outflows in the preceding two years. Bank loan mutual funds experienced net inflows of \$19.1 billion over this period, while high-yield bond funds experienced net inflows of \$8.0 billion in 2016 but net outflows of \$16.6 billion in 2017 (Charts 4.13.4, 4.13.5). Alternative mutual funds, which include funds that implement long-short, market-neutral, and inverse strategies, and which had constituted the fastest-growing category of mutual funds in recent years, experienced \$8.1 billion of net outflows in 2016 and \$1.1 billion of net inflows in the first ten months of 2017 (Chart 4.13.6).

Investors have continued to gravitate away from actively-managed equity mutual funds and towards lower-cost, index-based equity funds. As of October 2017, passively managed mutual funds and exchange-traded funds (ETFs) represented 45 percent of U.S. equity fund AUM, up from 26 percent in 2009. From 2015 year-end through October 2017, passively managed international and U.S. equity funds witnessed inflows of \$642 billion, while their actively managed counterparts witnessed outflows of \$454 billion (Chart 4.13.7). In fixed income mutual funds, both actively-managed and index funds have continued to experience inflows.

### 4.13.3 Exchange-Traded Products

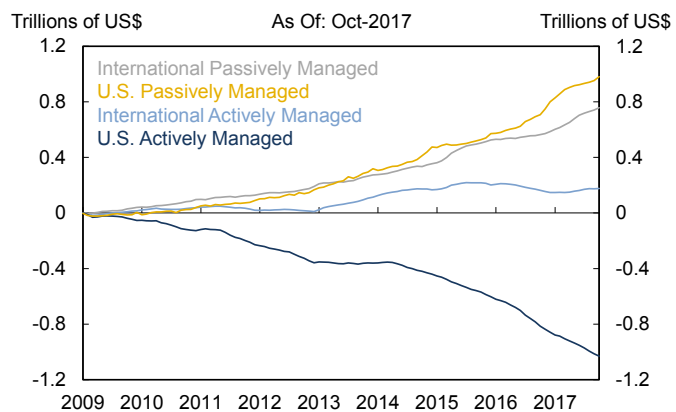
In 2016 and 2017, U.S. exchange-traded products (ETPs) continued to expand at a faster pace than many other types of investment vehicles. AUM increased 20 percent in 2016 and an additional 28 percent over the first ten months of 2017, reaching \$3.3 trillion by October month-end (Chart 4.13.8). AUM growth has been primarily driven by inflows, which totaled \$286 billion in 2016 and \$384 billion in the first ten months of 2017. U.S. equity ETFs accounted for half of all inflows in 2016, while international equity, taxable bond, and U.S. equity ETFs each counted for approximately 30 percent of total inflows during the first ten months of 2017. The industry—which includes ETFs, exchange-traded notes, and certain other investment vehicles—remains concentrated, with the three largest ETP managers accounting for over 80 percent of total ETP assets. The number of available ETPs increased 8 percent in 2016 and an additional 4 percent over the ten months of 2017, driven by products focused on alternative asset classes or strategies.

ETFs, which constitute most ETP assets, accounted for approximately 15 percent of the U.S. investment company industry in September 2017, up from 12 percent at the end of 2015 and 4 percent in 2006. Index-based ETFs across nearly all asset classes experienced strong rates of net asset growth over this time period. Additionally, so-called “strategic” beta or “smart” beta ETFs, which differ from traditional index-based funds by targeting certain risk and return characteristics such as volatility or income, grew rapidly in 2016 and 2017.

### 4.13.4 Pension Funds

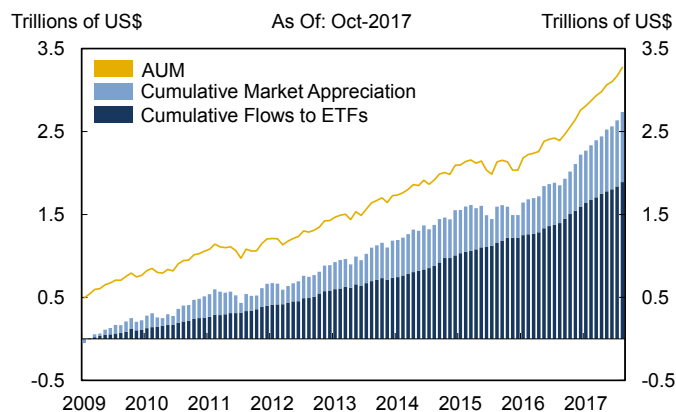
As of the first quarter of 2017, the combined AUM of U.S. private and public pensions, including federal pensions and defined contribution plans, was approximately \$27.3 trillion (Chart 4.13.9). Changes to pension allocations can amplify asset price volatility and exacerbate business cycle fluctuations. However, the broader impact of such changes and potential risks emanating from pension funds

### 4.13.7 Cumulative Equity Fund Flows



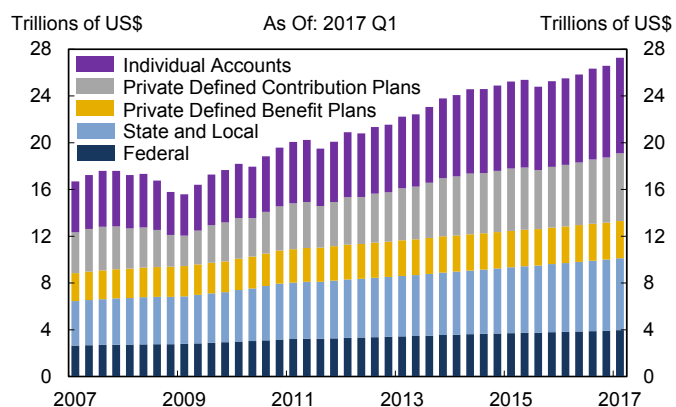
Source: Morningstar, Inc. Note: Includes ETFs and mutual funds.

### 4.13.8 U.S.-Listed ETP AUM



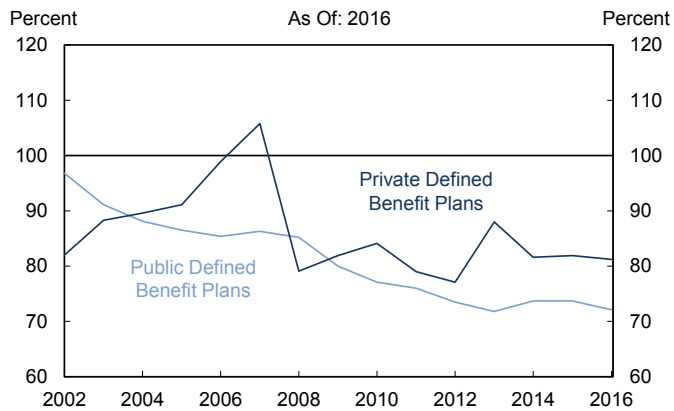
Source: Morningstar, Inc.

### 4.13.9 Retirement Fund Assets by Plan Type



Source: Federal Reserve, Haver Analytics

#### 4.13.10 Public and Private Pension Funding Levels



Source: Public Fund Survey, Milliman 2016 Pension Funding Study

are difficult to assess given data limitations, including lack of uniform reporting, timeliness, and granularity of pension assets, liabilities, and return assumptions.

#### Corporate Plans

Corporate defined benefit funded status—the estimated share of fund liabilities covered by current assets—was little changed in 2016 (**Chart 4.13.10**). One estimate of the funded status of the 100 largest corporate defined benefit pension plans in the United States was 83.3 percent in December 2016, up slightly from the previous year. During the first three quarters of 2017, the funded ratio increased to 84.3 percent, due to strong asset returns.

#### Multiemployer Plans

Plans in the multiemployer sector are on average 49 percent funded. While the Pension Benefit Guaranty Corporation (PBGC) projects the majority of multiemployer plans will remain solvent over the next 20 years, a core group of plans appears unable to raise contributions sufficiently to avoid insolvency within that period. According to the PBGC, over 1 million participants are covered in the plans facing insolvency.

The PBGC currently guarantees a maximum payment of \$12,870 per year for a retiree at age 65 with 30 years of service—substantially smaller than the guarantee PBGC provides to single-employer plans of \$64,432. The PBGC projects it will have insufficient funds to cover the projected future demands from multiemployer plans requiring financial assistance. It is more likely than not the PBGC multiemployer program will run out of money by 2025. When the multiemployer program becomes insolvent, the PBGC will be unable to provide financial assistance to pay the full level of guaranteed benefits in insolvent multiemployer plans.

The Kline-Miller Pension Reform Act allows multiemployer plans projected to become insolvent in the next 20 years (15 in some cases) to apply to the Treasury Department for

permission to reduce pension benefits if doing so would allow the plan to remain solvent over the long-term and continue to provide benefits at least 10 percent higher than the level of the PBGC guarantee, with further protections for the aged and disabled. Thus far, 15 plans have filed 19 applications with the Treasury Department. Four applications have been approved, five applications have been denied, and nine applications have been withdrawn. The remaining application is in the process of being evaluated.

### Public Plans

In 2016, the aggregate funded status of U.S. public pension plans was 72.1 percent, slightly lower than the prior year. Also of note, public pension funds generally use a different set of accounting rules than private pension funds. These rules enable them to assume investment returns based on their own long-run expectations, which are significantly higher than average post-crisis returns, and thus could overstate funded status. Most recently a number of large public plans have revised their long-term investment expectations downwards. The underfunding of certain public plans continues to exert fiscal pressure on their sponsoring municipalities including U.S. territories Puerto Rico and the U.S Virgin Islands, as well as certain municipalities such as Dallas and Chicago.

### 4.13.5 Alternative Funds

#### Hedge Funds

Despite the price rally in several asset classes in 2016, many hedge funds witnessed net outflows. Relatively weak returns and high fees led investors to pull approximately \$70 billion from hedge funds in 2016, breaking from six consecutive years of inflows. Flows were relatively flat in the first three quarters of 2017, with net inflows totaling \$1.2 billion year-to-date. Since 2015, the total number of hedge funds and hedge fund advisers stayed roughly the same, totaling approximately 9,000 and 1,700 respectively. As of the first quarter of 2017, hedge funds that file the SEC's Form

PF managed \$3.6 trillion of net assets, a 4.3 percent increase since the fourth quarter of 2015. Over the same period, the aggregate gross asset value (GAV) of hedge funds that file SEC's Form PF increased by 10.0 percent to \$6.5 trillion. (Using GAV as a measure for hedge funds reflects the effect of leverage obtained through cash and securities borrowing.) Generally, private funds that are reported on Form PF represent funds of investment advisers that are required to register with the SEC and have at least \$150 million in private fund AUM.

Responding to investor pressure, funds cut management fees in 2016, with approximately 70 percent of funds charging annual management fees of less than 2 percent of assets, up from approximately 60 percent in 2015. Specifically, there were reports that large hedge funds cut fees in 2016.

The hedge fund industry also remains relatively concentrated. As of the first quarter of 2017, the top ten hedge fund advisers (by NAV) that filed Form PF managed 18.7 percent of total hedge fund NAV. The top ten advisers (by gross notional exposure) represented 48.0 percent of gross notional exposures, which include derivatives. As of the first quarter of 2017, total borrowing by qualifying hedge funds was \$2.1 trillion, a 17.4 percent increase since 2015. This increase was driven mostly by increases in secured borrowing through prime broker and repo financing. Unsecured borrowing remained less than 1 percent of total borrowing.

Hedge funds returned an average of 6.2 percent in 2016, net of fees, though returns varied by strategy type. Distressed securities funds outperformed others in 2016, up 14.4 percent on average, driven largely by gains on their holdings of previously distressed debt and equity securities from the rebound in oil prices from the lows in the first quarter of 2016. Emerging markets funds and event-driven funds also ranked among the strongest performers of 2016. In 2017, hedge funds have returned an average of 7.4 percent year-to-date.

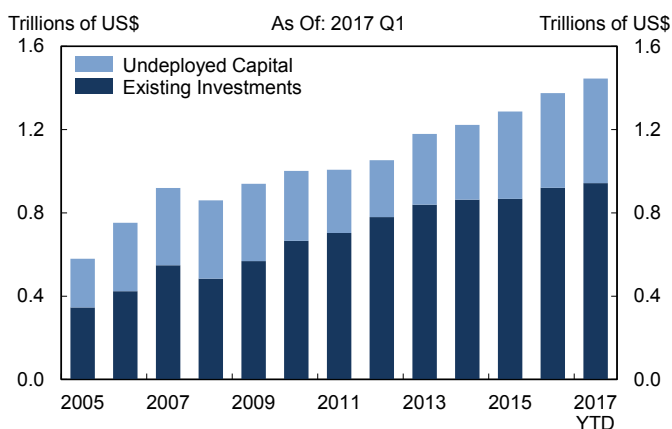
## Private Equity

The private equity industry continues to attract investor assets and is becoming increasingly concentrated. According to one measure of private equity that includes buyout, venture capital, and turnaround funds, private equity AUM increased 7 percent in 2016 and an additional 5 percent in the first quarter of 2017 (**Chart 4.13.11**). The industry continued to become more concentrated: the share of aggregate capital raised by the largest ten funds reached 26 percent in 2016, up from 19 percent in 2014.

According to SEC Form PF data from the first quarter of 2017, large private equity advisers, or advisers with at least \$2 billion in private equity AUM, managed approximately 72 percent of net assets for private equity funds that filed Form PF, which was similar to the previous year. For the funds managed by these large advisers, beneficial ownership from pension plans increased 10.0 percent since 2015 to \$507 billion while sovereign wealth funds and other foreign entities and insurance companies increased 16.7 percent (to \$154 billion) and 11.9 percent (to \$94 billion) year-over-year, respectively. Collectively, these investors beneficially own over 50 percent of net assets of private equity funds managed by the large advisers.

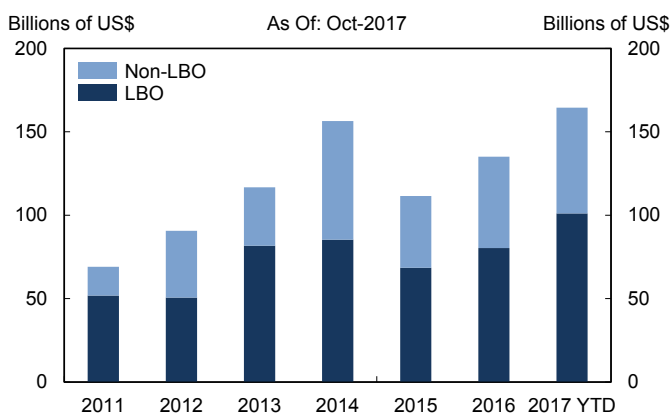
Acquisition-related activity backed by private equity increased in 2016 and 2017, driven by higher leveraged buyout volumes (**Chart 4.13.12**). Similarly, private equity recapitalizations financed with leveraged loans, in the form of dividends and equity contributions, increased 55 percent in 2016, to \$96 billion.

### 4.13.11 North American Private Equity AUM



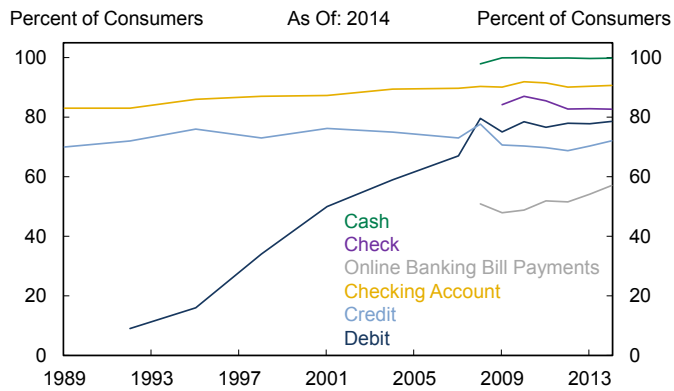
Source: Preqin

### 4.13.12 M&A Loan Volume for Private Equity-Backed Issuers



Source: S&P LCD

#### 4.14.1 U.S. Consumer Adoption of Payment Instruments



Source: Federal Reserve Bank of Boston

Note: Survey of Consumer Finances data from 1989 to 2007. Survey of Consumer Payment Choice data from 2008 to 2014

## 4.14 New Financial Products and Services

Financial innovation has created new methods of making payments or lending. Such developments are often evolutionary changes to current practices, made by existing financial institutions within extant markets. In recent years, some new financial products and services have been labeled ‘FinTech,’ short for ‘financial technology.’ This subsection discusses longer-term trends in the areas of payments and lending, providing recent data when available.

### 4.14.1 Payments

Consumers have gradually changed the ways in which they have made payments through time. For example, data from the Federal Reserve’s Survey of Consumer Finances shows that only about 10 percent of consumers had debit cards in 1992; over the next 22 years, that proportion increased to about 80 percent (**Chart 4.14.1**). Similarly, responses to the Federal Reserve’s Survey of Consumer Payment Choice showed that the percentage of consumers using online banking bill payments increased from about 50 percent to nearly 60 percent between 2008 and 2014.

In the past few years, several new ways of making payments have developed; among them are peer-to-peer money transfer services and virtual currencies. Peer-to-peer transfers allow consumers to make payments to other consumers or firms online, usually through a mobile device app. The apps are usually linked to debit or credit card accounts or bank accounts, and the funding transfers therefore proceed through existing payment networks. Although some providers of such services are relatively new companies and experienced substantial growth in 2016, banks and other existing financial service providers have also entered the market.

Virtual currencies, such as Bitcoin, represent a different approach to payment. Some of these currencies use distributed ledger technology (or a related technology known as blockchain

technology), in which data are shared across a network, with identical copies stored at and synchronized across multiple locations. Virtual currencies are only used by a very small number of consumers; about one half of one percent of respondents to the 2015 Survey of Consumer Payment Choice reported using virtual currencies. The underlying technology of distributed ledgers, however, could have much broader applications beyond those of virtual currencies. Some financial institutions have implemented such systems in proof of concepts to evaluate the potential for broader adoption in areas such as interbank and intrabank payments, derivatives processing, repo clearing, and trade finance.

#### **4.14.2 Lending**

Marketplace lending is a relatively new type of financial service focused on loans. Initially marketplace lending focused on retail investors providing funding to individual borrowers, and was called peer-to-peer lending. It has now evolved to largely include funding by institutional investors to provide financing to consumer and small business loans. Many such lenders use a variety of data sources and emerging technologies for customer acquisition and loan origination and servicing. These data sources include traditional underwriting criteria, such as income and debt obligations, but may also include other forms of information, such as real-time business accounting and payment and sales history. Some of the largest marketplace lenders in the consumer finance area concentrate on providing debt consolidation loans and refinancing existing student loans. Although marketplace lending is growing, it represents a small portion of overall lending. Leading marketplace lending platforms have originated more than \$70 billion in loans since 2009.

Marketplace lenders fund loans in a variety of ways, including through public offerings, securitizations, loans from banks, whole loan sales to institutional investors, and individual retail investors who provide funding to individual borrowers. Depending on their



funding model, marketplace lenders may not bear the risk of borrower default and may not hold the loans on their balance sheet. Whole loan sales to institutional investors and the securitization market in particular have become an increasingly important source of term funding. Approximately \$9.3 billion of ABS backed by loans originated by marketplace lenders were issued in 2016, and 2017 issuance through October is already 18 percent higher at \$11.0 billion, contributing to a cumulative \$27.3 billion of such ABS to date.

Although marketplace lending has the potential to reduce costs and expand access to credit, the extent to which these benefits have been realized thus far is unclear. Furthermore, the marketplace lending model has not been tested through a full credit cycle. There are risks that misalignment of incentives could exist on these platforms.

Since the Council's 2016 annual report, actions by financial regulatory agencies have included continued implementation of capital and liquidity standards for financial institutions; application of supervisory and company-run stress tests; supervisory review and comment on large banking organizations' resolution plans; implementation of additional reforms of the derivatives markets and of asset management practices; and measures intended to enhance consumer protection. Regulators have also taken steps to further tailor certain existing regulations, including capital requirements and the rules implementing the Volcker Rule. The Council continued to fulfill its mandate to monitor potential risks to U.S. financial stability and serve as a forum for discussion and coordination among the member agencies.

The following is a discussion of the significant financial regulatory reforms implemented since the Council's 2016 annual report.

## 5.1 Safety and Soundness

### 5.1.1 Enhanced Capital and Prudential Standards and Supervision

In May 2016, the FDIC, OCC, and Federal Reserve issued a proposed NSFR rule. The objective of the NSFR is to mitigate the potential effects of disruptions to a firm's regular sources of funding and create incentives for a firm to improve its structural funding profile and lengthen the maturity of its funding sources. The proposed rule would apply to BHCs, certain savings and loan holding companies, and depository institutions that, in each case, have \$250 billion or more in total consolidated assets or \$10 billion or more in total on-balance sheet foreign exposure and to their consolidated subsidiaries that are depository institutions with \$10 billion or more in total consolidated assets. The proposed rule would also apply a modified, less stringent requirement to BHCs and certain savings and loan holding companies with \$50 billion or more in assets.

In June 2016, the Federal Reserve issued an advance notice of proposed rulemaking inviting comment on conceptual frameworks for capital standards that could apply to nonbank financial companies designated by the Council for supervision by the Federal Reserve that have significant insurance activities and to depository institution holding companies significantly engaged in insurance activities. In this advance notice of proposed rulemaking, the Federal Reserve indicated that standards for the two groups would differ, but both sets of standards would recognize the differences between insurance companies and banks and would use insurance-focused risk weights and formulas that reflect the nature of insurance liabilities. Also in June 2016, the Federal Reserve issued a proposed rule to apply enhanced prudential standards to nonbank financial companies designated by the Council for supervision by the Federal Reserve that have significant insurance activities. As required under the Dodd-Frank Act, these standards would apply liquidity, corporate governance, and risk management standards to the firms. The proposed rule would also require companies to employ both a chief risk officer and chief actuary to help ensure that firm-wide risks are properly managed.

In September 2016, the Federal Reserve released a policy statement detailing the framework the Federal Reserve will follow in setting the CCyB for private-sector credit exposures located in the United States. The CCyB is a macroprudential tool that can be used to raise capital requirements on internationally active banking organizations when the risk of above-normal losses is elevated. The CCyB is intended to help banking organizations absorb shocks associated with declining credit conditions and also help moderate fluctuations in the supply of credit. The policy statement provides background on the range of financial system vulnerabilities and other factors the Federal Reserve may take into account as it evaluates settings for the buffer, including leverage in the nonfinancial sector, leverage in the financial sector, maturity and liquidity transformation in the financial sector, and asset valuation pressures. In October 2016 and then again in December 2017, the Federal Reserve, in consultation with the FDIC and OCC, affirmed the CCyB at its current level of 0 percent, following the framework detailed in the Federal Reserve’s policy statement.

In December 2016, the Federal Reserve issued a rule requiring U.S. G-SIBs to meet a new long-term debt requirement and a new total loss-absorbing capacity requirement. The rule requires U.S. G-SIBs to maintain a minimum amount of loss-absorbing instruments, including a minimum amount of unsecured long-term debt. In addition, the final rule prescribes certain additional buffers, the breach of which would result in limitations on the firms’ capital distributions and discretionary bonus payments. The final rule applies similar requirements to the top-tier U.S. IHC of any foreign G-SIB with \$50 billion or more in U.S. non-branch assets. The rule also subjects the operations of both U.S. and foreign G-SIBs to “clean holding company” limitations that prohibit certain activities and cap the value of certain liabilities of top-tier U.S. BHCs of U.S. G-SIBs and top-tier U.S. IHCs of foreign G-SIBs.

Also in December 2016, the Federal Reserve adopted a final rule requiring all depository institution holding companies and covered nonbank companies that are required to calculate the LCR to publicly disclose several measures of their liquidity profile. The rule requires these companies to publicly disclose on a quarterly basis quantitative information about their LCR calculation and a discussion of the factors that have a significant effect on their LCR.

In September 2017, the Federal Reserve, FDIC, and OCC proposed a rule intended to reduce regulatory burden by simplifying several requirements in the agencies’ regulatory capital rules. Specifically, the proposal would simplify the capital treatment for certain acquisition, development, and construction loans, mortgage servicing assets, certain deferred tax assets, investments in the capital instruments of unconsolidated financial institutions, and minority interest. Most aspects of the proposed rule would apply only to banking organizations that are not subject to the “advanced approaches” in the capital rule, which are generally firms with less than \$250 billion in total consolidated assets and less than \$10 billion in total foreign exposure.

### **5.1.2 Dodd-Frank Act Stress Tests and Comprehensive Capital Analysis and Review**

Section 165(i) of the Dodd-Frank Act requires two types of stress tests. First, the Federal Reserve must conduct annual supervisory stress tests of BHCs with \$50 billion or more in total consolidated assets, U.S. IHCs of FBOs with \$50 billion or more in U.S. non-branch assets, and nonbank financial companies designated by the Council for supervision by the Federal Reserve. Second, financial companies with more than \$10 billion in total consolidated assets regulated by a primary federal financial regulatory agency must conduct annual company-run stress tests, and BHCs with \$50 billion or more in total consolidated assets and nonbank financial companies designated by the Council must also conduct semiannual company-run stress tests. In June 2016 and June 2017, the Federal Reserve released the results of the 2016 and 2017 supervisory stress tests, respectively (see [Section 4.11.1](#)).

In January 2017, the Federal Reserve adopted a rule removing the qualitative assessment of CCAR for “large and noncomplex firms,” which are BHCs and U.S. IHCs of FBOs with total consolidated assets between \$50 billion and \$250 billion and total nonbank assets of less than \$75 billion that are not identified as G-SIBs. The rule also reduces certain reporting requirements for large and noncomplex firms. Large and noncomplex firms will still be required to meet their capital requirements under stress as part of CCAR’s quantitative assessment and will be subject to regular supervisory assessments that examine their capital planning processes. Additionally, the final rule decreases the amount of additional capital that any BHC subject to the Federal Reserve’s capital plan rule can distribute to shareholders in connection with a capital plan that has not been objected to unless prior approval is obtained from the Federal Reserve. Previously, a firm could distribute up to an additional 1 percent of its tier 1 capital beyond the amount in its capital plan. The final rule reduced that amount to 0.25 percent of tier 1 capital.

### 5.1.3 Resolution Planning and Orderly Liquidation Authority

Under the framework of the Dodd-Frank Act, resolution under the U.S. Bankruptcy Code is the statutory first option in the event of the failure of a financial company. Section 165(d) of the Dodd-Frank Act requires nonbank financial companies designated by the Council for supervision by the Federal Reserve and BHCs with total consolidated assets of \$50 billion or more—including FBOs that are, or are treated as, BHCs—to report periodically to the Federal Reserve, the FDIC, and the Council with plans—also referred to as living wills—for their rapid and orderly resolution under the U.S. Bankruptcy Code in the event of material financial distress or failure. The Federal Reserve and the FDIC review each plan and may jointly determine that a plan is not credible or would not facilitate an orderly resolution of the company under the U.S. Bankruptcy Code. If the Board of Governors of the Federal Reserve and the FDIC Board of Directors make such a joint determination, the agencies must notify the company of the deficiencies in its plan, and the company must resubmit its plan with revisions that address the deficiencies jointly identified by the Federal Reserve and FDIC, including any proposed changes in business operations and corporate structure. The company must also explain why it believes that the revised plan is credible and would result in an orderly resolution under the U.S. Bankruptcy Code.

If a firm fails to adequately remediate its identified deficiencies, the Federal Reserve and the FDIC, acting jointly, may impose more stringent capital, leverage, or liquidity requirements, or restrictions on growth, activities, or operations of the firm, or its subsidiaries. If, following a two-year period beginning on the date of the imposition of such requirements, a firm still has failed to adequately remediate any deficiencies, the Federal Reserve and the FDIC, in consultation with the Council, may jointly require the firm to divest certain assets or operations to facilitate an orderly resolution of the firm in bankruptcy.

In April 2016, the agencies jointly determined that the 2015 resolution plans of each of Bank of America, Bank of New York Mellon, JPMorgan Chase, State Street, and Wells Fargo were not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code. The agencies issued joint notices of deficiencies to the five firms detailing the deficiencies in their plans and the actions the firms must take to address them. Each firm was required to remediate its deficiencies by October 1, 2016. In December 2016, the agencies jointly determined that Bank of America, Bank of New York Mellon, JPMorgan Chase, and State Street adequately remediated deficiencies in their 2015 resolution plans.

The agencies jointly determined that Wells Fargo did not adequately remedy two of the firm’s three deficiencies, specifically in the categories of “legal entity rationalization” and “shared services.” The agencies also jointly determined that the firm did adequately remedy its deficiency in the “governance” category. In light of the nature of the deficiencies and the resolvability risks posed by Wells Fargo’s failure to remedy them, the agencies jointly determined to prohibit Wells Fargo from establishing international bank entities or acquiring any nonbank subsidiary. The agencies also jointly determined that if after reviewing the March

submission the agencies both determined that the deficiencies were not adequately remedied, the agencies would limit the size of the firm's nonbank and broker-dealer assets to levels in place on September 30, 2016. Wells Fargo submitted a revised plan in March 2017, and in April 2017, the agencies announced that Wells Fargo had adequately remediated the deficiencies they had identified. As a result, the firm is no longer subject to the growth restrictions.

In April 2016, the agencies also provided guidance to be incorporated into the next full plan submissions, which were submitted by July 1, 2017 by the five firms, as well as Goldman Sachs, Morgan Stanley, and Citigroup, and are reviewing those plans under the statutory standard.

If the agencies jointly decide that the shortcomings identified in the 2015 resolution plans or the guidance have not been satisfactorily addressed in a firm's 2017 plan, the agencies may determine jointly that the plan is not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code. In addition, the agencies subsequently extended the next resolution plan filing deadline for these eight firms—the U.S. G-SIBs—by one year to July 1, 2019.

In March 2017, the agencies jointly announced that they did not find that the resolution plans submitted by 16 domestic non-G-SIBs in December 2015 were not credible or would not facilitate an orderly resolution under the U.S. Bankruptcy Code. The agencies did identify shortcomings in Northern Trust Corporation's resolution plan, which must be satisfactorily addressed in the firm's 2017 plan. The agencies announced that for the 15 firms without shortcomings, the expectations for the firms' 2017 plans would be tailored to reflect the size and complexity of the firms and as a result, the agencies would limit the amount of information the firms are required to submit in their plans, due by December 31, 2017.

The agencies also issued joint guidance to four foreign G-SIBs—Barclays PLC, Credit Suisse, Deutsche Bank AG, and UBS AG. Consistent with the time provided to the largest domestic filers in April 2016, the agencies provided a one-year extension to these firms—their next resolution plans are now due on July 1, 2018.

In October 2016, the Secretary of the Treasury, as Chairperson of the Council, adopted rules in consultation with the FDIC to implement the qualified financial contract (QFC) recordkeeping requirements of the Dodd-Frank Act. The rules require U.S. G-SIBs, nonbank financial companies designated by the Council, and certain other financial companies to maintain records with respect to QFC positions, counterparties, legal documentation, and collateral. This information would assist the FDIC in the event of an orderly liquidation of a financial company under the Dodd-Frank Act.

In 2017, the Federal Reserve, FDIC, and OCC adopted parallel rules that would require, among other things, certain G-SIBs operating in the U.S. to ensure that their cross-border QFCs limit default rights and transfer restrictions to the same extent as under the Dodd-Frank Act and the Federal Deposit Insurance Act. In addition, G-SIBs would be generally prohibited from entering into QFCs that allow for the exercise of cross-default rights based on the resolution of the G-SIB's affiliate. Under the rules, G-SIBs may comply with the rule requirements by using the ISDA Universal Resolution Stay Protocol re-launched in 2015 to amend their QFCs. The 2015 protocol enables parties to amend the terms of their QFCs to contractually recognize the cross-border application of special resolution regimes, including the Dodd-Frank Act and Federal Deposit Insurance Act, and support the resolution of financial companies under the U.S. Bankruptcy Code.

#### 5.1.4 Volcker Rule

In August 2017, the OCC issued a notice seeking comment on whether certain aspects of the regulations implementing the Volcker Rule should be revised to better accomplish the purposes of the statute while decreasing the compliance burden on banking entities and fostering economic growth. The regulations implementing the Volcker Rule were issued in December 2013 by the Federal Reserve, FDIC, OCC, SEC, and CFTC and generally prohibit banking entities from (1) engaging in proprietary trading in securities, derivatives, commodity futures, and options on these instruments for their own account, and (2) owning, sponsoring, or having certain relationships with hedge funds, private equity funds, and other covered funds.

In addition, in July 2017, the Federal Reserve, FDIC, OCC, SEC, and CFTC announced that they are coordinating their respective reviews of the treatment of certain foreign funds under the Volcker Rule, and the banking agencies announced that, in connection with this review, they would not take action under the Volcker Rule for qualifying foreign excluded funds, subject to certain conditions, for one year.

#### 5.1.5 Insurance

Title V of the Dodd-Frank Act authorizes the Secretary of the Treasury and the U.S. Trade Representative jointly to negotiate a covered agreement on behalf of the United States. A covered agreement is an international agreement regarding prudential measures with respect to the business of insurance or reinsurance that achieves a level of protection for insurance and reinsurance consumers that is substantially equivalent to the level of protection achieved under state insurance or reinsurance regulation.

In January 2017, the United States and the EU announced their agreement on final text of a covered agreement (U.S.-EU Covered Agreement). The U.S.-EU Covered Agreement addresses three areas of insurance and reinsurance prudential measures: (1) group supervision; (2) reinsurance supervision, including collateral and local presence requirements; and (3) exchange of information between supervisory authorities.

The U.S.-EU Covered Agreement allows U.S. insurers with EU operations to avoid worldwide group capital, governance, and reporting requirements under the EU's "Solvency II" prudential regulatory system for insurers, as well as EU local presence and collateral requirements for U.S. reinsurers. The agreement builds on U.S. initiatives underway at the state level and commits the United States to eliminating state-based reinsurance collateral requirements as applied to liabilities ceded to EU reinsurers that meet the consumer protection standards specified in the agreement. Collateral elimination for EU reinsurers will apply prospectively only, on a national basis, and according to the timeline established in the agreement.

On September 22, 2017, the U.S.-EU Covered Agreement was signed by the Secretary of the Treasury and the U.S. Trade Representative on behalf of the United States, as well as by the Estonian and EU Ambassadors to the United States on behalf of the EU. In conjunction with signing the agreement, the United States released a policy statement that provides additional clarity for the domestic insurance sector on certain terms of the agreement, and addresses how the United States intends to implement the agreement. The policy statement states that the agreement "affirms the U.S. system of insurance regulation, including the role of state insurance regulators as the primary supervisors of the business of insurance" in the United States, and recognizes the key implementation role that state insurance regulators will play in meeting U.S. obligations under the agreement, including revising relevant state laws concerning credit for reinsurance.

In December 2016, Treasury issued updated regulations that implement the Terrorism Risk Insurance Program Reauthorization Act of 2015 (TRIPRA), including requiring all participating insurers to provide information annually to Treasury about the terrorism risk insurance that they write. In April 2017, Treasury commenced its first mandatory data collection from participating insurers in Treasury's Terrorism Risk Insurance Program (TRIP), pursuant to the requirements of TRIPRA. This information forms the basis for various reports Treasury issues under TRIPRA. In June 2017, Treasury published a Study of Small Insurer Competitiveness in the Terrorism Risk Insurance Marketplace, which was based in large part on information submitted by insurers during the 2017 data call. Among other things, the study found that small insurers form a significant component of the market for terrorism risk insurance in the United States, particularly in certain individual lines of insurance subject to TRIP. The study also found that the market share of small insurers in the lines of insurance subject to TRIP has gradually decreased over time, consistent with their market share decline in lines of insurance not subject to TRIP.

State insurance regulators, through the NAIC, continue work on updating the NAIC's insurance financial solvency framework and refining existing NAIC accounting, actuarial, reporting, valuation, and risk-based capital standards. All 50 states, the District of Columbia, and the Commonwealth of Puerto Rico have adopted amendments to the Insurance Holding Company System Regulatory Act, including a new requirement to submit an annual enterprise risk report. In addition, several states have adopted amendments to their Insurance Holding Company Act statutes to clarify their authorities to act as group-wide supervisor for certain internationally active insurance groups (IAIGs). States continue to enact new and updated NAIC model laws related to the Solvency Modernization Initiative, including the Risk Management and Own Risk and Solvency Assessment Model Act (requiring the ORSA filing), which has been enacted in all but one state. In addition, 47 states have adopted the revised Standard Valuation Law to implement principle-based reserving (PBR). The three-year implementation period for PBR began January 1, 2017. The NAIC also continued developing, with Federal Reserve Board consultation, a group capital calculation to provide a consistent tool for state insurance regulators to use when assessing group capital. Most states, covering 76 percent of direct insurance premiums across all lines of business, have adopted the 2011 revisions to the NAIC Credit for Reinsurance Model Law and Regulation, which is an accreditation standard effective January 1, 2019. Finally, the NAIC launched the Macro Prudential Initiative to improve the ability of state insurance regulators and industry to address macro-prudential impacts, focusing on four areas: liquidity, recovery and resolution, capital stress testing, and exposure concentrations. The liquidity work is currently underway and includes addressing data gaps for regulators' existing work in assessing liquidity risk, as well as proposing a liquidity stress testing framework for larger life insurers.

The states, through the NAIC, have established a more consistent regulatory framework for life insurance-affiliated captive reinsurance transactions entered into after 2014 relating to certain term and universal life insurance products. This framework provides for the public disclosure of the reserves and assets related to those transactions, new risk-based capital requirements and additional disclosure in the annual audit report. In 2016, state insurance regulators, through the NAIC, adopted the Term and Universal Life Insurance Reserve Financing Model Regulation, which will codify the framework requirements into state law. After committing to make changes to the statutory framework for variable annuities to address the incentives for insurers to use captives for variable annuity transactions, the NAIC is refining proposed changes to the statutory framework for variable annuities.

State insurance regulators continue to focus on insurer cybersecurity issues. The NAIC adopted "Principles for Effective Cybersecurity Insurance Regulatory Guidance," which promote uniform standards, accountability, and access to necessary information for the protection of consumers. It also adopted an Insurance Data Security Model Law which establishes standards for data security, investigation, and data breach notification to insurance regulators. The NAIC reviewed and updated cybersecurity examination

standards in the NAIC Financial Condition Examiner's Handbook to incorporate concepts from the NIST Cybersecurity Framework. The NAIC also established a new Cybersecurity and Identity Theft Insurance Coverage Supplement to the Property and Casualty Annual Statement to gather information about insurers selling cybersecurity insurance products and the market for such products. In August 2017, the NAIC reported on the results of the second annual filing of the supplement, which indicate an overall U.S. cybersecurity insurance market of \$2.49 billion. State insurance regulators collect this data in order to perform trend analyses on exposures, premium volumes, and claims activity.

FIO, the Federal Reserve, and state insurance regulators along with the NAIC are the U.S.-based members of the International Association of Insurance Supervisors (IAIS) – the international standard-setting body for supervision of the insurance sector. The U.S. members of the IAIS participate in a number of initiatives at the IAIS intended to improve supervisory standards across jurisdictions and enhance financial stability.

On June 16, 2016, the IAIS published revisions to the initial 2013 assessment methodology for identifying global systemically important insurers. The updated assessment methodology outlines a five-phase process that relies on fact-based qualitative and quantitative elements. The IAIS modified certain indicators and incorporated the use of absolute reference values for indicators relating to derivatives trading, financial guarantees, and reinsurance. In November 2016, the FSB, after consultation with the IAIS and national authorities, identified a list of nine global systemically important insurers (G-SIIs). The IAIS applied the updated assessment methodology again in 2017. In November 2017, the FSB stated that it had decided not to publish a new list of G-SIIs for 2017, and it also encouraged the work of the IAIS to develop an activities-based approach to systemic risk in the insurance sector.

In February 2017, the IAIS began work to further enhance its systemic risk assessment framework by developing an activities-based approach to assessing potential systemically risky activities and consideration of policy measures to address such activities. This work is expected to conclude in 2019, with public consultations in late 2017 and 2018.

FIO, the Federal Reserve, state insurance regulators, and the NAIC have participated in IAIS committees and working groups involved in the development of global capital standards that would apply to IAIGs. This work includes annual iterations of field test exercises that involve the collection and analysis of data from volunteer IAIGs, including some of the largest U.S.-based insurance groups. In July 2017, that work culminated in the release of Insurance Capital Standard (ICS) Version 1.0 for extended field testing. In November, the IAIS announced that it reached an agreement on a path forward for group capital standards in furtherance of its goal of a single ICS. While the IAIS plans for the ICS to be adopted in late 2019, two other global capital standards have already been adopted by the IAIS and endorsed by the FSB: a straightforward Basic Capital Requirement, adopted in 2014, that would apply to all G-SII group activities, including noninsurance activities; and an initial version of the Higher Loss Absorbency (HLA) requirements for G-SIIs, adopted in late 2015. It is expected that HLA will be implemented in 2022, and that, by then, ICS will serve as its foundation.

Based on feedback from the public consultations released in March 2017, the IAIS further refined numerous Insurance Core Principles covering issues such as governance, supervisory measures, supervisory coordination, resolution, and material relating to the Common Framework for the Supervision of Internationally Active Insurance Groups (ComFrame). While the Insurance Core Principles relate to all insurers within a jurisdiction, ComFrame includes guidance and standards specific to IAIGs.



FIO also chairs the IAIS Financial Crime Task Force (FCTF), and both the Federal Reserve and the NAIC are members of the FCTF. During 2016, the FCTF developed and the IAIS published a paper on cyber risk to the insurance sector addressing supervisory issues and challenges related to cyber threats.

## 5.2 Financial Infrastructure, Markets, and Oversight

### 5.2.1 Over-the-Counter Derivatives

The SEC, the CFTC, and the federal banking agencies continue to implement Title VII of the Dodd-Frank Act, which establishes a comprehensive regulatory framework for swaps and security-based swaps. In addition to the developments below, in 2017, the CFTC initiated “Project KISS,” an agency-wide review of CFTC rules, regulations, and practices with the aim of making them simpler, less burdensome, and less costly. The CFTC solicited and received recommendations from the public as part of this review.

#### Security-Based Swaps

In July 2016, the SEC adopted amendments to Regulation SBSR designed to increase transparency in the security-based swap market. The amendments require a national securities exchange or security-based swap execution facility to report a security-based swap executed on such platform that will be submitted to clearing. The amendments also require a registered clearing agency to report any security-based swap to which it is a direct counterparty, as well as whether the clearing agency has accepted a security-based swap for clearing. The amendment prohibits a registered SBSDR from imposing fees or usage restrictions on the security-based swap transaction data that it is required to publicly disseminate under Regulation SBSR. The SEC also adopted amendments extending Regulation SBSR’s regulatory reporting and public dissemination requirements to additional types of cross-border security-based swaps. In addition, the SEC offered guidance regarding the application of Regulation SBSR to security-based swaps resulting from prime brokerage arrangements and from the allocation of cleared security-based swaps.

#### Capital Requirements for Swap Dealers and Major Swap Participants

In December 2016, the CFTC proposed rules to establish minimum capital requirements for swap dealers and major swap participants that are not subject to the capital rules of a prudential regulator. The proposed rules generally permit the application of alternative approaches based upon existing U.S. bank regulators’ capital requirements or the CFTC’s FCM requirements and the SEC’s broker-dealer net liquid asset capital requirements. The proposal further provides that those swap dealers predominantly engaged in non-financial activities, as well as major swap participants, may elect minimum capital requirements based upon the firms’ tangible net worth. Also, swap dealers may use internal models for purposes of computing their regulatory capital, subject to prior approval by either the CFTC or the National Futures Association. The rules would also require certain swap dealers and major swap participants to satisfy defined liquidity requirements.

#### Position Limits

Also in December 2016, the CFTC updated its proposal for rules limiting speculative positions in 25 core physical commodity futures contracts and their “economically equivalent” futures, options, and swaps. The re-proposed rule generally sets non-spot month speculative position limits at 10 percent of the open interest for the first 25,000 contracts and 2.5 percent of the open interest thereafter. Spot-month position limit levels are set at the lower of 25 percent of deliverable supply or the level set by a designated contract market (DCM). The proposed rules also include exemptions for bona fide hedging positions in physical commodities and their economically equivalent futures, and define requirements and acceptable practices for DCMs and SEFs

for setting position limits for the 25 referenced contracts. These acceptable practices include processes for DCMs and SEFs recognizing non-enumerated bona fide hedging positions, certain enumerated anticipatory hedge positions, and granting of spread exemptions.

### 5.2.2 CCPs

In September 2016, the SEC issued a final rule to establish enhanced requirements for the operation and governance of registered clearing agencies that meet the definition of a “covered clearing agency.” A covered clearing agency includes a registered clearing agency that (i) has been designated as systemically important by the Council and for which the SEC is the supervisory agency or (ii) provides CCP services for security-based swaps or is involved in activities the SEC determines to have a more complex risk profile, unless the CFTC is the clearing agency’s supervisory agency. The new rule is consistent with relevant international standards, such as the Principles for Financial Market Infrastructures (PFMI). Securities clearing agencies covered by the new rule will be subject to new requirements regarding, among other things, their financial risk management, governance, recovery planning, operations, and disclosures to market participants and the public.

In October 2016, the CFTC expanded the existing clearing requirement for interest rate swaps. The Dodd-Frank Act amended the Commodity Exchange Act to prevent market participants from entering into a swap that the CFTC has required to be cleared unless that market participant submits the swap for clearing. The CFTC’s determination requires that swaps denominated in certain currencies and having certain termination dates be submitted for clearing.

In addition, in July 2016, CFTC staff issued, via a staff letter, guidance to CCPs related to further development of recovery and wind-down plans, setting forth questions that CCPs should consider in evaluating whether particular tools should be included in their plans and in designing proposed rule changes to support the inclusion of particular tools in their plans.

To promote interagency engagement on potential risks associated with CCPs and potential policy responses, the Council’s interagency staff-level working groups have held several targeted sessions covering CCP default and liquidity risk management, risk management governance, bank-CCP interactions, and clearable products. Staff continue to review CCP risk management and the interconnections between CCPs and their clearing members and the broader financial system.

Throughout 2016, the Basel Committee on Banking Supervision, CPMI-IOSCO, and the FSB continued to make progress on their joint work plan to address CCP resilience, recovery, and resolution as requested by the G-20 in 2015. In August 2016, CPMI-IOSCO published a report on the assessment of selected CCPs’ implementation of certain principles in the PFMI, finding that these CCPs have generally made meaningful progress in implementing arrangements consistent with the financial risk management and recovery standards of the PFMI. Some gaps and shortcomings were also identified in the areas of recovery planning and credit and liquidity risk management.

In August 2016, the FSB published a discussion note on CCP resolution and resolution planning, which sought public comment on core aspects of effective CCP resolution strategies. In July 2017 the FSB published guidance for CCP resolution and resolution planning for authorities to consider when developing resolution strategies and plans for CCPs. The guidance takes into account the comments received on the FSB’s discussion note published in August 2016 and the consultative document published in February 2017.

## Box D: Stress Testing of Derivatives Central Counterparties

Since the introduction of mandatory central clearing for standardized OTC derivatives in 2010, the importance of CCPs to the financial system has increased significantly. Accordingly, regulators have focused on ensuring that CCPs are resilient in the event of highly stressful market conditions. A critical component of evaluating and improving CCP resilience is stress testing. Stress testing involves estimating potential losses under a variety of extreme but plausible market conditions, which helps firms and regulators determine whether CCPs are maintaining sufficient financial resources to withstand stress events. A stress test may be performed by a CCP (internal) or by a regulator (supervisory).

In the context of derivatives CCPs, a stress test addressing credit risk estimates the potential losses for a house or customer account based on actual positions in such accounts and hypothetical price changes to those positions. These positions may be in exchange-traded derivatives (futures or listed options) or OTC derivatives (swaps). Among other potential scenarios, a stress test may use a price change that actually occurred on a particular date (e.g., Black Monday in 1987 or the collapse of Lehman Brothers in 2008) or may use a price change based on a number of standard deviations calculated using historical data. If a stress test identifies a potential shortfall, then it may be necessary for a clearing member to reduce its positions or for a CCP to increase its financial resources. In addition to credit risk, stress tests may also address a variety of other risks that CCPs face, such as liquidity, operational, and cybersecurity risks.

There have been a number of notable recent domestic and international developments regarding CCP stress testing.

### Domestic Developments

In November 2016, CFTC staff published a report on its first supervisory stress tests of the five largest CCPs registered with the CFTC and their largest clearing members. The stress tests focused only on credit risk and applied a one-day shock to estimate losses. For the specific scenarios tested, the CCPs had sufficient pre-funded financial resources to cover defaults by at least the two clearing members (including affiliates) with the largest margin shortfalls. For almost two thirds of the stress tests, the CCPs had sufficient financial resources to cover defaults by every clearing member in the exercise that incurred a loss.

In October 2017, CFTC staff published a report detailing the results of an evaluation of settlement liquidity at three CCPs registered with the CFTC that clear futures, options, and interest rate swaps. The purpose of the analysis was to assess the impact of a hypothetical extreme but plausible market scenario on the ability of the three CCPs to meet their settlement obligations on time. The report contained three key findings. First, all three CCPs demonstrated the ability to generate sufficient liquidity to fulfill settlement obligations on time. Second, the CCPs generated funds in a number of ways, including: (i) using cash received from maturing reverse-repos; (ii) selling collateral; (iii) accessing cash balances at a commercial bank; (iv) accessing cash balances at a central bank; (v) converting one currency to another; and (vi) entering into repos. Third, in instances in which multiple CCPs used the same methodology or the same firm to meet liquidity demands, staff concluded that the cumulative size of liquidity requirements in this scenario would not impair the ability of each CCP to meet its settlement obligations.

### **International Developments**

In April 2016, the European Securities and Markets Authority (ESMA) published a report describing stress tests of 17 CCPs based in the EU—the first EU-wide supervisory CCP stress tests. Like those conducted by CFTC staff, ESMA's stress tests addressed credit risk. The stress tests found that the CCPs' resources were sufficient to cover losses resulting from the default of the top two EU-wide clearing member groups but faced small amounts of total residual uncovered losses in certain more severe scenarios. ESMA has also published a framework for its planned 2017 EU CCP stress tests, which will, for the first time, incorporate liquidity stresses.

In July 2017, CPMI-IOSCO published a report on resilience of CCPs, which included guidance on CCPs' internal stress tests with respect to their own credit and liquidity risks. Additionally, in June 2017, CPMI-IOSCO published a consultative framework for supervisory stress testing of CCPs. The draft framework is designed to support supervisory stress tests conducted by one or more authorities that examine the potential macro-level impact of a common stress event affecting multiple CCPs.

### 5.2.3 Asset Management

In October 2016, the SEC adopted a final rule designed to promote effective liquidity risk management throughout the open-end investment company industry, reducing the risk that funds will be unable to meet their redemption obligations and to mitigate potential dilution of the interests of fund shareholders. Under the new rule, registered open-end management investment companies other than MMFs must establish liquidity risk management programs. A fund's liquidity risk management program generally would include classification of all assets into four liquidity categories and setting a fund-specific minimum requirement for highly-liquid investments. ETFs that redeem in kind would be subject to a tailored liquidity risk management program that manages their liquidity risk without including all of the elements of the program applicable to other funds. A fund will also be required to confidentially notify the SEC when the fund's level of illiquid investments exceeds 15 percent of its net assets or when highly liquid investments fall below the fund's minimum for more than a brief period of time. In addition, the SEC adopted new requirements to modernize and enhance the reporting and disclosure of information regarding fund liquidity and redemption practices by open-end funds. For a further discussion of the amendments to reporting requirements, refer to [Section 5.4.1](#).

Also in October 2016, the SEC issued a rule permitting registered open-end management investment companies, except MMFs and ETFs, to use swing pricing under certain circumstances. Swing pricing is the process of adjusting the fund's NAV per share to effectively allocate the costs stemming from shareholder purchase or redemption activity to the shareholders associated with that activity.

### Money Market Mutual Fund Reforms

The SEC adopted MMF reforms in July 2014 that established a floating NAV for institutional prime and tax-exempt MMFs and required that MMF boards have the ability to impose liquidity fees and redemption gates for institutional prime and tax exempt MMFs and for retail MMFs in certain circumstances. The use of fees and gates is optional for government MMFs. The compliance date for these reforms was October 2016. See [Section 4.13.1](#) and [Box C](#) for a discussion of the transition in the MMF industry.

### 5.2.4 Operational Risks for Technological Systems and Cybersecurity

In September 2016, the CFTC adopted amendments to its system safeguards testing rules for DCMs, SEFs, SDRs, and, in a separate rule, for derivatives clearing organizations (DCOs). The amendments specify and define the types of cybersecurity testing essential to fulfilling system safeguards testing obligations, including vulnerability testing, penetration testing, controls testing, security incident response plan testing, and enterprise technology risk assessment, and clarify a number of other rule provisions. The amendments also add new provisions applicable to covered DCMs and all SDRs instituting minimum frequency requirements for conducting the essential types of cybersecurity testing and requirements for performance of certain tests by independent contractors.

In October 2016, the FDIC, OCC, and Federal Reserve jointly released an advance notice of proposed rulemaking for enhanced cyber risk management standards for large interconnected entities under their supervision and those entities' service providers. The notice addresses five categories of cyber standards: cyber risk governance; cyber risk management; internal dependency management; external dependency management; and incident response, cyber resilience, and situational awareness. The notice discusses implementing the enhanced standards in a tiered manner, imposing more stringent standards on the systems of those entities that are critical to the functioning of the financial sector.

In November 2016, the CFTC published a supplemental notice of proposed rulemaking for its proposed Regulation AT, a series of risk controls, transparency measures, and other safeguards to enhance the safeguards for automated trading on U.S. DCMs. The supplemental proposal simplified the risk control framework originally proposed by concentrating pre-trade risk controls at a minimum of two levels instead of three. It also narrowed the set of participants who would be considered AT Persons subject to, among other things, the proposed risk control requirements by adding a minimum trading volume test. Finally, the proposal updated the means by which the CFTC would access the algorithmic trading source code.

The Federal Financial Institutions Examination Council (FFIEC), on behalf of its members, also published updated booklets within the FFIEC IT Examination Handbook. Revisions to the Information Security Booklet included an update of factors necessary to assess the level of security risk to a financial institution's information systems and an incorporation of cybersecurity concepts such as threats, controls, and resource requirements for preparedness. Another revision added an Appendix E to the Retail Payment Systems booklet, covering the risks associated with mobile financial services.

### **5.2.5 Accounting Standards**

In June 2016, the Financial Accounting Standards Board issued an Accounting Standards Update on the measurement of credit losses for financial instruments. The new standard replaces the incurred loss impairment methodology in current U.S. Generally Accepted Accounting Principles with a current expected credit losses (CECL) methodology that reflects lifetime expected credit losses. Under CECL, collection expectations are updated at each reporting period such that the net amount recognized on the balance sheet represents the amount expected to be collected. CECL applies to all financial instruments carried at amortized cost (e.g., loans held for investment and held-to-maturity securities). The standard also requires consideration of a broader range of supportable information to determine credit loss estimates. The measurement of expected credit losses had been based on relevant information about past events and current conditions. The new measurement will now include reasonable and supportable forecasts that affect the collectability of the reported amount.

In addition, for purchased loans that have a more than insignificant amount of credit deterioration since origination, the purchasers must estimate and record an allowance for credit losses at the time of purchase. An allowance will now also need to be considered for available-for-sale debt securities if the fair value is below the amortized cost of the security. The new standard becomes effective for fiscal years beginning after December 15, 2019 for SEC filers and after December 15, 2020 for all other entities, with early adoption permitted in fiscal years beginning after December 15, 2018.

## 5.3 Mortgages and Consumer Protection

### 5.3.1 Mortgages

In October 2016, the CFPB published a final rule clarifying, revising, and amending provisions of its mortgage servicing rules regarding force-placed insurance notices, policies and procedures, early intervention, and loss mitigation requirements under Regulation X's servicing provisions and prompt crediting and periodic statement requirements under Regulation Z's servicing provisions. The rule also addresses proper compliance regarding certain servicing requirements when a person is a potential or confirmed successor in interest, is a debtor in bankruptcy, or sends a cease communication request under the Fair Debt Collection Practices Act.

### 5.3.2 Consumer Protection

In November 2016, the CFPB published a final rule implementing certain consumer protections for prepaid accounts under Regulation E and Regulation Z. The final rule modifies general Regulation E requirements to create tailored provisions governing disclosures, limited liability and error resolution, and periodic statements for prepaid accounts, and adds new requirements regarding the posting of account agreements. Additionally, the final rule regulates overdraft credit features that may be offered in conjunction with prepaid accounts. Subject to certain exceptions, such credit features will be covered under Regulation Z when the credit feature is offered by the prepaid account issuer, its affiliate, or its business partner and credit can be accessed in the course of a transaction conducted with a prepaid card.

In April 2016, the Department of Labor published a final rule that broadens the scope of who is determined to be a “fiduciary” under the Employee Retirement Income Security Act of 1974 as a result of giving investment advice to a plan or its participants or beneficiaries. The rule also applies to the definition of a “fiduciary” of a plan (including an IRA) under the Internal Revenue Code of 1986. The rule treats persons who provide investment advice or recommendations for a fee or other compensation with respect to assets of a plan or IRA as fiduciaries in a wider array of advice relationships. The Department of Labor is currently re-examining the rule pursuant to a presidential memorandum issued in February 2017.

In July 2017, the CFPB published a rule prohibiting banks and other covered providers of certain consumer financial products and services from using an agreement with a consumer that provides for arbitration of any future dispute between the parties to bar the consumer from filing or participating in a class action concerning the consumer financial product or service. In addition, the rule requires providers that are involved in an arbitration pursuant to a pre-dispute arbitration agreement to submit arbitral and court records to the CFPB. In October 2017, Congress passed a joint resolution pursuant to the Congressional Review Act nullifying the rule.

In October 2017, the CFPB adopted a rule addressing payday lending practices. Among other things, the rule identifies it as an unfair and abusive practice for a lender to make covered short-term or longer-term balloon-payment loans, including payday and vehicle title loans, without reasonably determining that consumers have the ability to repay the loans according to their terms. In addition, for these and certain other high-cost longer-term loans, the rule identifies it as an unfair and abusive practice to make attempts to withdraw payment from consumers' accounts after two consecutive payment attempts have failed, unless the consumer provides a new and specific authorization to do so. Following the CFPB's rulemaking, the OCC rescinded its guidance regarding safe and sound banking practices and consumer protection in connection with deposit advance products, which are small-dollar, short-term loans made by a bank that are to be repaid by the customer from that customer's next recurring direct deposit into his or her account.

## 5.4 Data Scope, Quality, and Accessibility

Assessing and monitoring risks to financial stability requires financial data that are of high quality and fit for analytical purpose. Further, these data must be accessible to stakeholders in a timely manner to both monitor risks and produce analyses as input to develop informed policy responses. The demands on data for systemic risk analysis can be viewed in terms of three attributes of data: scope, quality, and accessibility.

### 5.4.1 Data Scope

Data scope refers to the comprehensiveness and granularity of the data available for regulators and financial market participants to support analysis of threats to financial stability and private sector risk management. Since the crisis, regulators have gained greater visibility into previously opaque areas through new data collections, such as those on hedge fund and MMF activities. However, data gaps remain in some markets. Financial innovation results in new markets and products, requiring financial regulators to seek new data. The pursuit of new data should be with an eye towards improving reporting efficiency, leveraging existing collections, and utilizing industry utilities and new data technology.

#### Securities Financing Data Collection

To fill data gaps in securities financing, and in response to earlier Council encouragement, the OFR is in the process of developing a rule to collect data on repo and certain securities lending transactions. The planned collection is informed by a pilot collection that was undertaken by the OFR, the Federal Reserve, and the SEC in 2015. The data can be used to conduct research, engage in ongoing monitoring, and to facilitate appropriate and secure sharing of the data among Council member agencies.

#### SEC Asset Management Rules

The SEC issued final rules in October 2016 to enhance data reporting for mutual funds and other registered investment companies, significantly improving information available to investors and the SEC. Under the rules, the SEC's current reporting Forms N-Q and N-SAR, which are required to be filed semi-annually, will be replaced by new monthly reporting on Form N-PORT and annual reporting on Form N-CEN; the SEC also introduced a new form called Form N-LIQUID. Form N-PORT will collect information on a fund's investments, such as the terms of derivatives contracts; information regarding portfolio characteristics, such as information on assets and liabilities, repo agreements, securities on loan and reinvestment of cash collateral from securities on loan; and certain portfolio-level risk measures. Form N-CEN will collect census-type information for registered investment companies, such as arrangements with third-party service providers and information regarding securities lending activities and ETFs. Form N-LIQUID will require a fund to confidentially notify the SEC when the fund's level of illiquid investment holdings exceed 15 percent of its net assets or when its highly liquid investment holdings fall below its minimum for more than a specified period of time. For a further discussion on the fund liquidity risk management requirements, refer to **Section 5.2.3**.

The SEC also issued a final rule in August 2016 to enhance reporting on separately managed accounts managed by registered investment advisers and to collect information about other aspects of registered investment advisers' advisory business, including branch office operations and the use of social media.

#### Consolidated Audit Trail

In November 2016, the SEC approved a National Market System (NMS) plan to create a single, comprehensive database—a consolidated audit trail (CAT)—that would enable regulators to more efficiently and accurately track trading in equity and option securities throughout U.S. markets. SEC Rule 613 required the self-regulatory organizations (SROs) to jointly submit a plan to create, implement, and maintain a CAT. The approved plan provides for construction of a central repository by a plan processor. The central repository



would receive, consolidate, and retain trade and order data reported as part of the CAT. CAT data would be available to SROs and the SEC for regulatory purposes, such as reconstructing market events and monitoring market behavior to identify and investigate misconduct. Market event reconstructions made possible by the CAT also will contribute to the SEC and SROs' understanding of and ability to respond to future market disruptions.

### Central Counterparties

Following post-crisis international efforts, regulators are working to shift the standardized portion of the bilateral derivatives market to CCPs. CCPs promote greater transparency and product standardization and reduce counterparty risk, thus reducing some of the risks to financial stability from bilateral trading. However, central clearing creates new forms of interconnections between the clearing members of CCPs.

In 2016, many CCPs began publicly disclosing risk-related quantitative information as a result of the CPMI-IOSCO developed quantitative disclosure standards for CCPs. These disclosures have enabled participants and observers to better evaluate and assess the risks of CCPs in a consistent fashion. Examples of the types of information that CCPs have made public through their disclosures relate to: credit risks, default resources, collateral quality, aggregate margin data, default rules and procedures, market volumes/values data, operational risk management, and liquidity risk management. Although these quantitative disclosures allow market participants to assess the risk in CCPs, additional disclosures and disclosure standardization may provide greater transparency.

### 5.4.2 Data Quality

Data quality refers to the completeness, accuracy, and timeliness of data. Better data quality for financial stability analysis and risk management can be achieved through utilizing data standards, providing a common reference for industry data, and establishing operational excellence in data management for both regulators and the private sector.

### Legal Entity Identifier

The LEI is a globally recognized, unique, 20-digit, alphanumeric code assigned to a legal entity that registers to receive it. Assigned LEIs are intended to enable the precise identification of counterparties. The LEI will be increasingly valuable as use and experience grows and as the LEI system continues to gather and assimilate "Level 2" information submissions about the direct and ultimate parents of each entity with an LEI. The LEI system began collecting Level 2 information in May 2017 as entities choose to register for or renew their LEIs, a process that will continue over the succeeding months. Level 2 data includes only hierarchy data that is publicly available in cases where the respective parent has its own LEI. With these hierarchy data, the LEI system will provide an additional tool for understanding the complex structures of large companies.

With regard to financial entities supervised by the U.S. banking agencies, the Federal Reserve's National Information Center already makes available both rich and complete hierarchy data as well as extensive entity reference data, including LEIs for those supervised entities that have registered.

As of December 4, 2017, more than 800,000 LEIs have been issued by 30 operational issuers that have been approved to issue LEIs. Approximately 40 percent of these have been issued in the United States, and approximately 18 percent have been issued to U.S.-based entities. The cost to obtain an LEI has dropped significantly following the entry of a new authorized issuer in the United States, creating more competition on price. The total number of LEIs issued represents a 97 percent increase from year-end 2015. The increase has been largely driven by the use of the LEI in derivatives reporting, and in anticipation of new mandatory LEI reporting in Europe under the revised Markets in Financial Instruments Directive (or MiFID II), which is set to become effective in January 2018. In markets where the use of the LEI is not mandated, issuance has been uneven. Also, some 21 percent of the entities that have obtained LEIs are behind schedule with regard to the annual renewal and verification of their LEI reference data, although not every regulation explicitly requires entities to renew their LEIs if no changes have occurred to their LEI reference data. While this proportion has been reduced over time, Council member agencies and other global financial regulators continue to participate in joint efforts to increase the quality of LEI reference data.

### Reporting of Derivatives Data

Promoting transparency in derivatives markets continues to be a major priority for global regulators. Representatives from the CFTC, OFR, SEC, and Federal Reserve continued to contribute to the global harmonization of OTC derivatives data. This work is taking place through a working group for harmonization of key OTC derivatives data elements (Harmonization Group), under the auspices of the CPMI-IOSCO. This cross-jurisdictional initiative will facilitate global aggregation of these data and reduce complexity for firms reporting to multiple trade repositories or authorities.

The Harmonization Group has already issued final technical guidance on the Unique Transaction Identifier and Unique Product Identifier, along with consultation documents on three sets of prioritized Critical Data Elements for global harmonization. The Unique Product Identifier and Unique Transaction Identifier are being designed to respectively identify each OTC derivatives product and each transaction involving an OTC derivatives product, which is reported to a trade repository.

Critical to these efforts is the development of governance systems to ensure the quality of reported derivatives data (e.g., that duplicate identification numbers are not issued and that derivatives products and transactions are correctly categorized). In 2016, the FSB established the Working Group on Unique Transaction Identifier and Unique Product Identifier Governance. Several Council member agencies have been participating in the working group, which is expected to provide recommendations to the FSB on the necessary governance functions and key criteria definitions for the Unique Transaction Identifier and Unique Product Identifier. All of this work has involved soliciting input from the public and industry before developing recommendations. To this end, in March 2017, the FSB issued a consultative report on Unique Transaction Identifier governance for public comments.

### Mortgage Data Standards

Revisions to Regulation C, which implements the HMDA, were finalized in October 2015. Covered financial institutions will begin collecting the revised data in 2018 and will first report the data to the appropriate

federal agency in 2019. The ULI will be included in the new HMDA collection, as will the LEI. The new report will also include risk-related loan characteristics, including credit score, interest rate, property value, and discount points paid to reduce the interest rate. Most covered financial institutions will be required to report data on all closed-end, dwelling-secured, consumer-purpose mortgages and some covered financial institutions will also be required to report data on open-end, dwelling-secured, lines of credit. Currently, only closed-end home purchase loans, home improvement loans, and refinancings are reported. HELOCs are currently voluntarily reported.

Additionally, the Mortgage Industry Standards Maintenance Organization (MISMO) is in the process of developing data structures to assist with mortgage servicing transfers. The new capabilities will standardize the format of the data and establish requirements for completeness.

The Council recommended in its 2016 annual report that member agencies update their regulatory mortgage data collections to include ULI and LEI fields, so that these fields are paired with loan records through a loan's lifecycle. In 2016, the GSEs issued a draft uniform residential loan application form with a field for the new ULI. In 2017, the GSEs announced that they would begin collecting the ULI for all applicable loans at delivery. In anticipation of the new HMDA collection, MISMO has produced a technical document to aid HMDA reporters with production and transfer of the ULI. The addition of the ULI and LEI fields will improve market traceability and transparency for mortgages.

In licensing and supervising mortgage loan originators, state regulators regularly collect mortgage data through the Nationwide Multi-state Licensing System (NMLS). In 2011, the Conference of State Bank Supervisors (CSBS), in conjunction with the American Association of Residential Mortgage Regulators, launched the NMLS Mortgage Call Report in accordance with the Secure and Fair Enforcement of Mortgage Licensing Act of 2008. The launch of the Mortgage Call Report marked the first standardized data collection for the state-licensed residential mortgage industry. The NMLS Mortgage Call Report enables state mortgage regulators to effectively monitor both licensees and mortgage activities by providing timely, comprehensive, and uniform information on the non-depository mortgage industry. In 2016, the Mortgage Call Report was updated to gather more information on loans not subject to qualified mortgage standards, collect data pertaining to mortgage servicing, establish requirements for completeness, and improve overall usability. Additionally, the State Regulatory Registry, the operator of NMLS, has entered into information sharing agreements on behalf of state regulators to enable the sharing of mortgage data with OFR, CFPB, and the FHA.

### 5.4.3 Data Accessibility

The global financial crisis of 2007-09 reinforced the importance and value of sharing financial data for risk management and policy making. The multi-agency nature of the regulatory environment makes sharing data collected by financial regulators essential to view the broad risks across the financial system. Better technical infrastructure, appropriate agreements, and established frameworks can enhance regulatory sharing (as permitted under statutory authority), while ensuring security and confidentiality of financial data. With such infrastructure, regulators can more quickly assess and address underlying risks that continue to persist. For example, such infrastructure could facilitate collaboration among multiple regulators seeking to understand the relevant factors at play in events such as the October 2014 surge in volatility in the U.S. Treasury market.

### Fostering Improved Data Sharing

There have been multiple efforts to improve data sharing across agencies. An interagency workshop was held in 2016 with a focus on improving data sharing. An interagency staff-level working group was created to use and share existing regulatory data to analyze hedge funds and potential financial stability implications. For further information on this interagency effort, see [Section 5.5.3](#). In 2016, the SEC adopted rules to provide

authorities with conditional access to data held by SBSDRs. The OFR has also has begun work to accomplish several objectives to better foster sharing of financial data amongst regulators. In addition, in January 2017, the CFTC issued a proposed rule to amend Part 49 requirements to establish procedures governing access to SDR data by certain foreign and domestic authorities as required by the Fixing America's Surface Transportation Act.

### Metadata Catalog

The OFR is enhancing its own catalog of metadata—descriptive data about the financial data the OFR stores securely—with the goal of linking portions of it with external counterparts. Through these linkages, this platform will enable users to find those relevant financial data for risk management and financial stability analysis via a centralized portal, and to facilitate access to the desired data with its custodian. Initially, the Metadata Catalog will be for OFR use, and subsequently will be opened for regulators to use at their discretion. Over the longer term, the goal is to make this resource available to the public and other stakeholders. The centralized portal could enhance regulators' ability to locate and access data needed for risk management and financial analysis.

## 5.5 Council Activities

### 5.5.1 Risk Monitoring and Regulatory Coordination

The Dodd-Frank Act charges the Council with responsibility to identify risks to U.S. financial stability, promote market discipline, and respond to emerging threats to the stability of the U.S. financial system. The Council also has a duty to facilitate coordination among member agencies and other federal and state agencies regarding financial services policy and other developments. The Council regularly examines significant market developments and structural issues within the financial system. This risk monitoring process is facilitated by the Council's Systemic Risk Committee (SRC), which is composed primarily of member agency staff in supervisory, monitoring, examination, and policy roles. The SRC serves as a forum for member agency staff to identify and analyze potential risks which may extend beyond the jurisdiction of any one agency. The Council's Regulation and Resolution Committee (RRC) supports the Council in its duties to identify potential gaps in regulation that could pose risks to U.S. financial stability. The RRC meets regularly to discuss regulatory developments at the Council's member agencies.

### 5.5.2 Determinations Regarding Nonbank Financial Companies

One of the Council's statutory authorities is to subject a nonbank financial company to supervision by the Federal Reserve and enhanced prudential standards if the company's material financial distress—or the nature, scope, size, scale, concentration, interconnectedness, or mix of its activities—could pose a threat to U.S. financial stability. The Council's authority to make these determinations is an important tool to help mitigate potential threats posed by these companies to U.S. financial stability. The Dodd-Frank Act sets forth the standard for the Council's determinations regarding nonbank financial companies and requires the Council to take into account 10 specific considerations when evaluating those companies.

Under Section 113 of the Dodd-Frank Act, the Council is required at least annually to reevaluate each previous determination and rescind any determination if the company no longer meets the statutory standards. The Council's supplemental procedures with respect to nonbank financial company determinations provide the public with additional information regarding the process for the Council's annual reevaluations of determinations.

In June 2016, the Council rescinded its determination regarding GE Capital. The Council designated GE Capital in July 2013. Since the Council's determination, the company executed significant divestitures, transformed its funding model, and implemented a corporate reorganization. As a result, the Council determined that GE Capital was a much less significant participant in U.S. financial markets and the economy. As detailed further in its public explanation of its decision, the Council concluded that these and other changes at GE Capital since the Council's determinations significantly reduced the potential for GE Capital's material financial distress to threaten U.S. financial stability.

In September 2017, the Council rescinded its determination regarding AIG. The Council designated AIG in July 2013. Since the Council's determination, both direct and indirect capital markets exposures to AIG have decreased substantially and the company has, through divestitures, exited certain important markets. Further, additional analyses conducted during the last annual reevaluation indicated that there is not a significant risk that a forced asset liquidation by AIG would disrupt market functioning. As detailed further in the public basis for its decision, these reasons and others led the Council to rescind its determination that material financial distress at AIG could pose a threat to U.S. financial stability.

As of the date of this report, one nonbank financial company is subject to a final determination by the Council, and since 2010 the Council has voted not to advance five nonbank financial companies to Stage 3 of the Council's three-stage process for evaluating nonbank financial companies. Since the Council's

last annual report, the Council has not advanced any nonbank financial companies to Stage 3 or made a proposed or final determination regarding any nonbank financial company.

### **5.5.3 Asset Management Analysis**

Building on work begun in 2014, the Council continued to assess the potential for financial stability risks to arise from certain asset management products and activities, particularly in the areas of liquidity and redemption, leverage, operational functions, securities lending, and resolvability and transition planning. In April 2016, based on this work, the Council issued a public update of its analysis, focusing primarily on liquidity and redemption risk, and the use of leverage.

The Council's discussion of liquidity and redemption risks explored the potential mismatch between investor redemption rights and underlying asset liquidity for pooled investment vehicles. The Council update suggested the following for consideration by the SEC: (1) robust liquidity management practices for mutual funds, particularly those that invest in less-liquid assets; (2) clear regulatory guidelines regarding mutual funds' holdings of potentially illiquid assets; (3) enhanced reporting and disclosure by mutual funds of their liquidity profiles, risk management practices, and external sources of financing; and, (4) the use of tools for allocating the costs of redemptions directly to investors who redeem shares.

With respect to the use of leverage in investment vehicles, the Council update noted that leverage can be a useful component of an investment strategy, and its use can allow managers to either hedge risk or increase exposures depending on the activities and strategies of the vehicle. The Council's analysis focused on the potential vulnerability of assets purchased with borrowed short-term funds to selling pressures in stress conditions, as well as on the exposures and interconnections to other market participants created by leverage. The Council update noted that existing SEC guidance limited the ability of registered funds to obtain leverage through repos and certain other financing transactions, and also acknowledged the proposed rule issued by the SEC in December 2015 intended to limit leverage obtained through the use of derivatives.

With respect to hedge funds, the Council created a staff-level interagency working group and charged it with: (i) using regulatory and supervisory data to evaluate the use of leverage, in combination with other factors, for purposes of assessing potential risks to financial stability; (ii) assessing the sufficiency and accuracy of existing data and information; and (iii) considering potential enhancements to current measurements of leverage, including risk-based measures.

The hedge fund working group provided an update on its work to the Council at the Council's November 2016 meeting. The working group's analysis of position-level data for interest rate derivatives, provided by the CFTC, showed that positions held by a relatively small group of funds constituted a meaningful share of certain key markets, relative to both market size and trading volume. However, the working group generally found existing sources of data to be insufficient for regulators to assess fully the extent of the risks, and therefore made a number of recommendations regarding potential data enhancements.

### **5.5.4 Operations of the Council**

The Dodd-Frank Act requires the Council to convene no less than quarterly. The Council held nine meetings in 2016 and has held eight meetings in 2017, including at least one each quarter. The meetings bring Council

members together to discuss and analyze market developments, potential threats to financial stability, and financial regulatory issues. Although the Council's work frequently involves confidential supervisory and sensitive information, the Council is committed to conducting its business as openly and transparently as practicable. Consistent with the Council's transparency policy, the Council opens its meetings to the public whenever possible. The Council held a public session at three of its meetings in 2016 and at two of its meetings in 2017. Approximately every two weeks, the Council's Deputies Committee, which is composed of senior representatives of Council members, convenes to discuss the Council's agenda and to coordinate and oversee the work of the Council's five other committees. The other committees are the Data Committee; the Financial Market Utilities and Payment, Clearing, and Settlement Activities Committee; the Nonbank Financial Companies Designations Committee; the Regulation and Resolution Committee; and the Systemic Risk Committee. The Council adopted its seventh budget in 2016 and its eighth budget in 2017.

#### **5.5.5 Section 119 of the Dodd-Frank Act**

Section 119 of the Dodd-Frank Act provides that the Council may issue non-binding recommendations to member agencies on disputes about the agencies' respective jurisdiction over a particular BHC, nonbank financial company, or financial activity or product. (Certain consumer protection matters, for which another dispute mechanism is provided under Title X of the Act, are excluded.) To date, no member agency has approached the Council to resolve a dispute under Section 119.

# 6

## Potential Emerging Threats and Vulnerabilities

### 6.1 Ongoing Structural Vulnerabilities

The Council's previous annual reports have identified structural vulnerabilities in the U.S. financial system. These have included: risk-taking incentives of large, complex, interconnected financial institutions; concentrations of activities and exposures in CCPs; reliance on less stable, short-term funding markets; continued use of reference rates that are not sufficiently derived from observable transactions and that may be susceptible to manipulation; challenges to data quality, collection, and sharing; and financial innovation and the migration of activities.

#### 6.1.1 Large, Complex, Interconnected Financial Institutions

In part due to implementation of the Dodd-Frank Act and other financial regulatory reforms, large BHCs are significantly better capitalized today, and hold significantly more HQLA than they did before the financial crisis (see Section 5.1.1). In addition, the largest BHCs that operate in the United States continue to be subject to both company-run and supervisory stress testing, and periodically submit resolution plans to the Federal Reserve and FDIC (see Sections 5.1.2 and 5.1.3).

However, cyclical factors have contributed to some challenges for BHCs in recent years. The prolonged low interest rate environment has depressed BHCs' NIMs, led BHCs to increase the duration of their portfolios, and contributed to increased risk-taking for CRE lending (see Section 4.5.3 and Box B). As discussed in Section 4.11.1, BHCs' ROE and ROA remain below pre-crisis levels. While such pressures should ultimately lessen with higher interest rates and a steepening yield curve, increases in rates can also create potential downsides, by reducing the value of securities held in portfolio, among other factors (as discussed in Section 6.3).

Despite these challenges, market-based measures of the riskiness of the largest U.S. BHCs, generally indicate low risk. Nonetheless, the Council remains vigilant about the potential threats such institutions may pose to financial stability. The BHCs should continue to be appropriately monitored based on their size, risk, concentration of activities, and offerings of new products and activities.

#### 6.1.2 Central Counterparties

CCPs help to promote financial stability in a number of ways, including improved transparency, the promotion of enhanced risk management across the financial system, standardized margin methodologies applied to all clearing members, expanded multilateral netting, and strict procedures for the orderly management of counterparty credit losses. However, because CCPs clear a very large volume of transactions, and because of the extent to which they are interconnected with other large and interconnected financial institutions, it is critical that CCPs be robust and resilient. The goal of robust and resilient CCPs can be accomplished in part through the continued implementation of CCP risk-management standards and recovery and wind-down plans. In addition, further analysis of the risk that clearing members may pose to CCPs and that CCPs may pose to the financial network as a



whole is appropriate. Regulators also continue to analyze a range of possible risks arising from or related to the potential failure of one or more clearing members, each of which may be a member of multiple CCPs and may provide essential services (such as liquidity provision, settlement or custody services) to multiple CCPs. This includes analysis of the potential for such failures to transmit stress among financial institutions or markets. Such analysis of the potential to transmit risk across financial institutions and markets will help regulators to better understand interconnections among CCPs, clearing members, and other financial institutions to help ensure the success of reforms that mandate greater use of central clearing.

Over the past few years, CCPs and financial regulators have made significant progress in the development and implementation of more robust risk-management standards. The PFMI promoted international risk management standards for CCPs, as well as other FMUs. Additionally, some authorities, including the CFTC, regularly monitor risk exposures at CCPs, pursuant to their regulatory regime. The CFTC collects daily reports of positions, risk measures, margins, collateral, and default resources, and maintains an active surveillance program. The CFTC has also implemented the G-20's central clearing mandate for interest rate swaps and CDS indices.

As discussed in [Section 5.2.2](#), in September 2016, the SEC issued a final rule to establish requirements consistent with the PFMI for the operation and governance of covered clearing agencies. Internationally, continued implementation and observance of the risk-management standards in the PFMI across jurisdictions, by both regulators and CCPs, will increase both the safety and efficiency of CCPs and promote a level playing field between CCPs globally.

Supervisory stress tests can also be an important contributor to risk management. The CFTC and foreign regulators have recently taken productive first steps in this area ([see Section 5.2.2 and Box D](#)). Supervisory stress tests can, for example, help to shed light on the risks and vulnerabilities related to the potential failure of the largest clearing members at a CCP, including in many cases those with membership in multiple CCPs. Such a failure or failures could have an adverse impact across markets and institutions. There have also been advances in the development of plans for recovery and wind down. U.S. regulators have been reviewing and providing guidance in recent years on recovery plans of CCPs designated by the Council.

Finally, the recent expansion of interest rate swap clearing requirements constitutes important progress in decreasing bilateral exposure in the swaps market. This could lead to a reduction in complexity and associated risks in both the swaps market and in the financial system as a whole.

### **6.1.3 Short-Term Wholesale Funding**

#### **Repo Markets**

Although progress has been made in recent years in reducing counterparty risk exposure in repo markets, the risk of fire sales of collateral by creditors of a defaulted broker-dealer remains. In addition, a better understanding is needed of the interdependencies among firms and market participants, particularly in the bilateral repo market, where more information would help regulators and supervisors better assess potential risks and vulnerabilities.

## MMFs and Other Cash Management Vehicles

MMFs and other cash management vehicles that offer a stable NAV can be subject to runs, which could disrupt short-term funding markets more broadly and have other adverse effects on related markets and firms. The reforms implemented by the SEC in October 2016 represent an important development in mitigating the risk of a run. However, while the adoption of a floating NAV likely reduced the risk of runs and related disruptions in short-term lending markets, the extent of that reduction is not clear. **Box C** describes the market impact surrounding the implementation of these reforms.

Although U.S. money markets have functioned well since MMF reforms were implemented, it is important to continue to monitor and assess the migration of funds to other cash management vehicles. In addition, it is important to understand the impact on institutions that have borrowed from prime MMFs in the past. Although much of the reallocation in assets so far appears to have remained within the MMF sector, it is not yet clear whether there will be further changes. Evaluating these possibilities will likely require efforts to fill data gaps.

In the new market and regulatory environment, some institutions may attempt to distinguish themselves by using new strategies that could increase credit, interest rate, or liquidity risks. More generally, regulations may have unintended consequences, and market participants and regulators should be alert to the possible emergence of new, unanticipated risks.

### 6.1.4 Reliance on Reference Rates

Over the past few years, regulators, benchmark administrators, and market participants have worked to improve the resilience of LIBOR and develop alternative reference rates. LIBOR and its administrator have been subjected to more direct oversight; little-used currency and tenor pairings have been eliminated; and submissions of individual banks to the panel have been embargoed for a three-month period. These and other reforms have reduced the incentives for participants to manipulate the benchmark. However, decreases in the volume of unsecured wholesale lending make it more difficult to obtain enough observable transactions on which to firmly base LIBOR submissions. This development creates the risk that publishing the benchmark may not be sustainable. Because of these concerns, the ARRC convened to identify one or more alternative near risk-free reference rates that fit both the needs of the market and standards of best practice. On June 22, 2017, the ARRC selected the Secured Overnight Financing Rate—to be produced starting in 2018 by the Federal Reserve Bank of New York, in conjunction with the OFR—as its recommended rate. The ARRC plans to release a final plan to encourage the transition to its recommended rate.

Regulators are concerned that LIBOR is not sustainable because it is based on a diminishing number of observable transactions. As a result, they have encouraged market participants to work with regulators to address risks related to LIBOR-based contracts maturing after 2021. The ARRC is engaged with market participants active across a wide range of financial contracts to address risks around reliance on LIBOR. For example, the ARRC is also working with ISDA to develop a protocol that would allow for more robust contract language in legacy swap contracts referencing LIBOR in the event that LIBOR were to cease publication.

### 6.1.5 Data Gaps and Challenges to Data Quality, Collection, and Sharing

The financial crisis revealed multiple deficiencies in the data needed for effective oversight of the financial system, as well as a firm's internal risk management and reporting capabilities. These gaps included the lack of comprehensive and clear data about the structure and ownership of financial entities, including data about these entities' parents and subsidiaries; the lack of standardized OTC derivatives data and access to derivatives transaction data by financial regulators; and different regulatory reporting requirements. Different regulatory reporting requirements may also lead to uneven reporting burdens for some participants.

In addition, some market participants continue to use legacy processes that rely on data that are not aligned to definitions from relevant consensus-based standards. These legacy processes often do not allow for adequate conformance and validation of data to the structures needed for data sharing. As financial markets continue to evolve, maintaining data quality will be a constant challenge for firms and regulators. Improving the quality of financial data and the methods for ensuring data quality will make data more usable, comparable, and fit for purpose.

Data collection initiatives, such as the planned collection informed by the joint OFR, Federal Reserve System, and SEC "Bilateral Repo Data Collection Pilot Project," have the potential to lead to greater transparency and reduced market risk for all participants.

### 6.1.6 Financial Innovation

Products and services offered in the financial system have evolved substantially over time. These changes have offered considerable benefits to market participants by, for example, potentially expanding access to credit, making payments more convenient, facilitating the execution of market transactions, reducing costs of regulatory compliance, or enabling more accurate pricing of risk. At the same time, innovation can pose a challenge to regulators, in part by causing financial activities to migrate to less-well understood markets or to institutions outside the regulators' current purview. Regulators must therefore continue to be vigilant in understanding the use and any potential misuse of new products and services and in monitoring the risks posed to the financial system by new developments.

Marketplace lending and payments are two areas in which technological developments have led to changes in financial products or services (see Section 4.14). By offering an additional source of loans to households and small businesses—and one that may incorporate new underwriting methods—marketplace lenders have the potential to increase the overall availability of credit. However, because the underwriting methods have not been tested through a credit cycle, they pose potential risks. The limited performance history of loans made through marketplace lenders makes it difficult to determine whether marketplace lenders have assessed risk appropriately. In addition, the impact of the business cycle on the provision of new credit by such lenders is unknown, leading to the possibility of swings in credit availability. Growth in this industry and continued competition with more traditional lenders could lead to weaker underwriting standards. Finally, some marketplace lenders use new funding models, whose behavior is also untested through a credit cycle.

In payments, the use of virtual currencies—which are often based on distributed ledger technology—is small but growing. As with any new development, virtual currencies and distributed ledger technologies can create risks and vulnerabilities that call for continued regulatory monitoring and coordination. In particular, decentralization of data storage from use of distributed ledgers may raise challenges for supervision and regulation, as current regulatory practices were designed for more centralized systems.

As detailed in [Section 4.14](#), these areas—marketplace lending, and the use of virtual currencies and distributed ledger technologies—are currently very small. Their current impact on financial stability is likely limited. However, in light of the growing number of market participants and financial institutions investing in these areas, it is desirable for financial regulators to monitor and analyze their effects on financial stability. These two areas are simply examples of new financial products and services, and it is equally important to be vigilant about developments in other areas that may pose equal or greater risks.

## 6.2 Cybersecurity: Vulnerabilities to Attacks on Financial Services

The Council has previously highlighted the unique threats associated with the possibility of a destructive malware attack targeting the financial services sector and urged continued work by the public and private sectors to reduce the risks associated with these and other cybersecurity threats. While the public and private sectors have made progress, ongoing work is needed as overall risks associated with significant cybersecurity incidents continue to increase and become more complex, and as malicious cyber actors continue to become more sophisticated and persistent. This increased complexity in part results from the fact that the financial sector continues to develop global, automated, highly integrated, and digitized services across nearly all segments of the industry. While this ongoing trend presents significant economic opportunities, it also has the potential to create new, and further exploit known, vulnerabilities, including vulnerability to malicious cyber activity.

For example, in February 2016, hackers using malware compromised the credentials of employees at Bangladesh Bank to send payment messages over the Society for Worldwide Interbank Financial Telecommunication (SWIFT) network, resulting in the theft of \$81 million. This breach—and the subsequent public reports of similar attacks—illustrated the technical proficiency and global reach of the hackers' ability to conduct cyber intrusions for criminal purposes. In the aftermath of this incident, SWIFT began working to design and implement a more robust customer security program focusing on elevating and reinforcing security of all participants that connect and interact with the SWIFT network.

The ever increasing scope and scale of data breaches also puts U.S. consumer information at significant risk. In September 2017, Equifax Inc. issued a press release announcing a cybersecurity incident earlier in the year related to a website application with unpatched software that may have impacted approximately 143 million U.S. consumers. Personally identifiable information for at least hundreds of thousands of people probably was exposed, including names, Social Security Numbers, birth dates, addresses, driver's license numbers, and credit card numbers.

Similarly, ransomware incidents continue to impact institutions both within the financial sector and across other parts of the nation's economy. Like many other types of malicious attacks, ransomware is a form of malware that is usually delivered through spearphishing emails. The malware encrypts data and locks users out of their systems. The perpetrator then demands a ransom payment in exchange for a decryption key, which is sometimes delivered in exchange for a payment. Ransomware targets end-users, making awareness and training a critical preventive measure, as well as consistent, frequent backups of all data to allow for restoration in the event of a successful attack. While ransomware has existed for several years, its presence may continue to expand as malicious actors leverage business functions to achieve their objectives.

Financial sector companies will continue to face cybersecurity risks, including risks posed by destructive malware and significant theft. Financial institutions should improve cybersecurity resilience by working with government agencies to better understand these risks, reduce risk exposure by engaging in information sharing efforts, and preparing to respond to and recover from major incidents. These preparations should continue to include consideration of the possible consequences to the institution—including financial, operational, and reputational consequences—of the theft of large sums of money and potentially destructive incidents. Effectively responding to today’s increased threat and complex IT environment requires significant collaboration between government and industry.

### 6.3 Asset Management Products and Activities

As discussed in **Section 5.5**, in April 2016 the Council issued an update on its review of potential risks to financial stability that might arise from asset management products and activities. In that update, the Council focused primarily on potential threats and vulnerabilities in the areas of liquidity and redemption risk, and the use of leverage. In October 2016, the SEC adopted rules to enhance liquidity risk management by funds, and to allow funds to adopt swing pricing to pass on transaction costs to entering and exiting investors (see **Section 5.2.3**). The SEC also issued final rules in October 2016 to enhance data reporting and disclosure for mutual funds and other registered investment companies, significantly improving information available to investors and the SEC.

In December 2015, the SEC issued a proposed rule on the use of derivatives by registered investment companies, including mutual funds, ETFs, and business development companies. Commenters have raised a number of concerns regarding this proposed rule, including, for example, concerns that the measures of derivatives exposure did not adequately reflect portfolio risk.

### 6.4 Managing Vulnerabilities in an Environment of Low, but Rising, Interest Rates

In previous annual reports, the Council has identified a number of vulnerabilities associated with prolonged low-yield environments. In search of higher yields, investors may buy assets with higher credit or market risks, possibly using more leverage or relying on shorter-term funding. These behaviors in turn can lead to large rises in asset valuations in certain markets; owners of such assets may then be subject to the risk of large declines in such prices. In addition, relatively flat yield curves put downward pressure on NIMs at depository institutions and broker-dealers. Institutions with large amounts of long-term liabilities such as insurance companies and pension funds will face additional challenges, as consumer demand for their products may be depressed.

While domestic and many foreign interest rates remain at very low levels, over the past year rates have risen somewhat. While these changes may reduce the risk-taking incentives arising from low rates, the consequences of past risk-taking may persist for some time, and the transition to higher rates may expose vulnerabilities among some market participants.

As discussed in **Section 4.5.3** and **Box B**, CRE markets have been exhibiting behavior consistent with elevated valuations for some time. CRE prices and loan quantities have been rising, and capitalization rates remain low. However, spreads of capitalization rates over Treasuries continue to remain flat. In addition, there is some evidence that banks have tightened underwriting standards for CRE loans over the past year. The possibility remains that CRE prices may fall sharply and unexpectedly, and that delinquency rates on CRE loans may rise.

Low rates can lead some firms and households to borrow excessively, creating problems later for financial institutions and other debtholders if such borrowers are unable to service or refinance their debt. As detailed in [Section 4.3](#), the ratio of total corporate debt to GDP—one benchmark for the ease with which the corporate sector can continue to service its debt—is currently elevated. And as noted in [Section 4.4](#), the ratio of household debt service to disposable personal income has been stable at a relatively low level for some time.

Rising interest rates may be a symptom or a cause of other problems. First, rates could be rising because investors are demanding increased risk premiums. However, such a development would lead to a general rise in spreads on yields between more- and less-risky assets. Although spreads on some assets have increased, as discussed in [Section 4.3](#), corporate credit spreads have generally continued to fall.

Second, although the cost of funding for depository institutions has remained low and stable, that may not persist. In the past, deposit rates have increased with a delay in response to rises in other market rates. The length of the current period of very low market rates is historically unprecedented, making the historical pattern less dispositive. In addition, evolution in competitive and regulatory conditions in banking markets may also alter the response.

A related point is that the quantity of deposits and other sources of bank funding have also historically responded sluggishly to movements in the opportunity cost between market rates and deposit rates. Such behavior could also be different this time. Deposit inflows to banks have been unusually large since the beginning of the financial crisis. It is possible that deposit outflows and migration to other deposit types could be larger or quicker than expected.

Finally, the rise in rates has caused the market values of available-for-sale securities at banks to fall in recent months. Related fluctuations in other comprehensive income could have some impact on regulatory capital for advanced approach institutions. Rising rates also impact debt service requirements for borrowers, especially those that have loans priced to a variable rate index.

## 6.5 Changes to Financial Market Structure and Implications for Financial Stability

Market making and liquidity provision are now undertaken by a wide variety of market participants, including not only the broker-dealers affiliated with large banks—historical providers of such services—but also asset managers, proprietary trading firms, and hedge funds, among others. The increased use of electronic trading platforms has allowed for growth in both algorithmic and high-frequency trading practices, which have been adopted by many liquidity providers and liquidity takers. These developments have benefited market participants through lower transaction costs, increased market efficiency, and fewer manual errors. However, these developments may also create new risks and vulnerabilities. In addition, changes in the regulations, such as the prohibitions under the Volcker Rule, can affect financial institutions' role in markets.

In recent years, there has been increased regulatory focus on the risks from both the faster speed of trades as well as the complexity of trading algorithms, as these can lead to operational risks that may be hard to predict or manage. There has also been heightened concern about so-called “flash events,” in which various markets have experienced sharp price moves, often with swift reversals. While some of these events have occurred in smaller markets or during illiquid trading hours, others have affected some of the largest markets in the world. Studies of events such as the Joint Staff Report on the U.S. Treasury Market on October 15, 2014 have not identified any specific cause, but instead point to a confluence of factors. When extreme, these events may lead to disruptions not just in the focal market, but also in highly correlated markets. Such possible transmission across markets highlights the possibility that flash events contribute to financial

instability, though the events to date have not seen spillovers at concerning levels. Financial regulators and market participants should continue to assess the complex linkages among markets, factors that could cause flash events to propagate across markets, and potential solutions to mitigate risks. As markets are global in nature, there should be active collaboration with and among regulators across jurisdictions to ensure coordination of efforts.

These changes in market structure have been accompanied by a substantial shift towards automating the investment process. Asset managers, hedge funds, banks, and others often rely on artificial intelligence, machine learning, and other advanced analytical tools to make investment decisions. These developments add complexity to the markets and can be a source of operational risk. For example, swift and automated trading algorithms—including correlated strategies across multiple investment firms—could react to inaccurate information in a way that creates unpredictable market volatility and threatens the safety and soundness of a financial institution. Financial regulators and market participants should assess the extent to which increased automation in investing affects the impact and efficacy of related regulations and consider whether regulatory guidance is warranted.

Finally, given the changes in market structure described above, liquidity provision during times of stress may differ now from historical norms in ways that are hard to anticipate. Where market-making was once the purview of traditional dealers, in an increasing number of products this role can be taken on by smaller institutions that make significant use of automated technology. With trading speeds increasing and practices becoming more automated, liquidity provision can also change quickly. This can create challenges for market participants who are not prepared for the level and speed of liquidity changes, and may result in mismatches between liquidity supply and demand. In many markets, investment strategies have evolved in response to these structural changes. Buy-side firms and high-frequency traders have increased real-time monitoring of liquidity conditions and further developed algorithms designed to minimize price impact. Buy-side firms have also better tailored investments to match the liquidity and risk appetites of their investors. These innovations all attempt to match trading needs with the more algorithmic environment that arises with market automation, and speak to the potential risks posed by the structural changes.

## 6.6 Global Economic and Financial Developments

Although conditions in foreign financial markets have improved over the past year, developments in Europe and EMEs in particular still have the potential to create risks and vulnerabilities for financial institutions and markets connected to those areas.

Equity prices rose and corporate and sovereign bond yields remained generally unchanged in many European economies in 2016 and 2017. While economic growth in the euro area strengthened in the first half of 2017, European banks remain vulnerable to macroeconomic shocks due to elevated levels of nonperforming loans and low levels of profitability (see **Box A**). Uncertainty about the global impact of further adverse developments in the European banking sector heightens the need to address challenges associated with cross-border resolution of global banking organizations. Additionally, while broad-based improvement in economic conditions has eased perceptions of risks in the periphery of the Eurozone, high levels of sovereign indebtedness remains a challenge for select countries, especially for Italy, Greece, and Portugal. Ongoing issues with Greece—namely, the need for Greece to reach agreement with European official creditors on sovereign debt relief and for Greece to meet obligations to complete its program in August 2018 and obtain consistent market access—are a source of lingering uncertainty.

## Box E: Closing Data Gaps in the U.S. Treasury Market

The U.S. Treasury market is the deepest and most liquid government securities market in the world. It plays a critical and unique role in the global economy, with Treasury securities acting as the primary means of financing the U.S. federal government, a broadly used investment instrument and hedging vehicle for global investors, a risk-free benchmark for other financial instruments, and an important tool for the Federal Reserve's implementation of monetary policy.

Since the last major review of the U.S. Treasury market in the 1990s, many structural changes in secondary Treasury trading have occurred. These changes include the introduction of electronic trading platforms, which have shifted trading from voice brokerage to a process which can be highly automated and at which transactions can occur at high speeds. The larger secondary market is split into two main components—the traditional inter-dealer broker market and a dealer-to-customer market. Most activity in the former is now conducted on electronic order-flow driven platforms, while the latter remains largely bilateral, and is spread across a range of platforms and execution methods. Additionally, the inter-dealer market has seen new entrants and new forms of competition. While the largest primary dealers still represent a significant share of inter-dealer trading, they account for less than half of the activity in this segment. Instead, principal trading firms (PTFs) now make up a large portion of trading in this market, as identified in The Joint Staff Report on the U.S. Treasury market volatility of October 15, 2014.

To explore these structural changes, Treasury issued a request for information (RFI) in January 2016 seeking public comment on the evolution of the U.S. Treasury market. The Treasury RFI included questions on trading and risk management practices, official sector data access, and the benefits and risks of increased public disclosure of market activity. Commenters expressed broad support for comprehensive data collection by the official sector. After reviewing the comment letters, Treasury and

the SEC announced that they were “working together to explore efficient and effective means of collecting U.S. Treasury cash market transaction information,” and requested that Financial Industry Regulatory Authority (FINRA) “consider a proposal to require its member brokers and dealers to report Treasury cash market transactions to a centralized repository.” In response to the request, FINRA proposed, and the SEC approved, new reporting requirements for FINRA member firms to report secondary market Treasury transactions to TRACE. FINRA began requiring member firms to report transactions in U.S. Treasury securities to TRACE on July 10, 2017. This initiative complements ongoing TRACE data collection of OTC secondary market transactions in other eligible fixed income securities, such as corporate bonds and agency debt securities.

FINRA reporting is thought to capture the majority of U.S. Treasury cash market transactions. Importantly, the reporting requirements cover trades of FINRA members with non-FINRA member counterparties, and also capture trading on major platforms operated by FINRA members. These requirements apply to all marketable Treasuries, including Treasury bills, notes, bonds, floating rate notes, and inflation-protected securities. The requirements also apply to separate principal and interest components of a U.S. Treasury security that have been separated pursuant to the Separate Trading of Registered Interest and Principal of Securities (STRIPS) program operated by Treasury.

As current reporting requirements only apply to trades of FINRA members, trades of non-FINRA members, such as non-member PTFs, are only reported to TRACE if conducted with or via a FINRA member. Moreover, such transactions are only reported as anonymous customer transactions, excluding the name of the specific entity with which the member firm traded. To provide a more complete view of Treasury trading in the secondary market, the Federal Reserve announced plans to collect data from banks for secondary market transactions in U.S. Treasury securities (and enter into negotiations with



FINRA to potentially act as the Federal Reserve's collection agent for the data).

While FINRA does not publicly disseminate TRACE data on Treasury securities at this time, the data provides regulators with an opportunity to gain a more comprehensive understanding of the U.S. Treasury market. The recent improvements in Treasury market data collection by FINRA do not include derivatives markets such as the ones for Treasury and interest rate futures whose close link to cash Treasury markets was highlighted by the Joint Staff Report on the U.S. Treasury market volatility of October 15, 2014. The CFTC collects market data on these products. Regulators will continue to evaluate whether additional steps are needed to promote a well-functioning U.S. Treasury market.

The long-term global consequences of the UK referendum to leave the EU are also unclear. On March 29, Prime Minister May provided formal notice to the EU of its invocation of Article 50 of the Treaty of Lisbon, the first step in the withdrawal process. While this action, and related statements by the UK and EU, may have removed some of the uncertainty about the range of possible outcomes, many details of the departure, including the timeline, are still being discussed. Market commentary has suggested that some financial services firms are planning to relocate some UK-based businesses to elsewhere in Europe. Such relocations are a source of strategic and operational risk to the institutions involved, and may have implications for overall financial stability.

Growth in most EMEs generally picked up in 2016 and 2017, with the exception of certain commodity producing economies contracting in 2016. While foreign investor flows to EMEs rebounded in 2016 and 2017, differences in yields available to investors across jurisdictions could lead to flow volatility. Capital outflows, economic slowdowns, and rising interest rates could impede the ability to roll over sovereign debt or refinance the borrowing of highly-leveraged firms.

China's economy continued its longer-term transition from manufacturing towards services and from investment towards consumption. At the same time, China's financial sector has grown increasingly complex, and Chinese firms have added to an already elevated level of corporate debt. These financial developments have heightened financial stability risks. A further slowdown in economic growth or a sharp correction in property price growth could have adverse consequences for closely-connected EMEs and for Chinese financial institutions. The Council will continue to monitor and assess these spillovers and other potential emerging risks to financial stability.



# Abbreviations

ABCP	Asset-Backed Commercial Paper
ABS	Asset-Backed Security
ACIS	Agency Credit Insurance Structure
AIG	American International Group, Inc.
AIS	Automated Indicator Sharing
ARRC	Alternative Reference Rates Committee
AUM	Assets Under Management
BEA	Bureau of Economic Analysis
BHC	Bank Holding Company
BIS	Bank for International Settlements
BoE	Bank of England
BoJ	Bank of Japan
C&I	Commercial and Industrial
CAS	Connecticut Avenue Securities
CAT	Consolidated Audit Trail
CBO	Congressional Budget Office
CCAR	Comprehensive Capital Analysis and Review
CCP	Central Counterparty

CCyB	Countercyclical Capital Buffer
CD	Certificate of Deposit
CDO	Collateralized Debt Obligation
CDS	Credit Default Swap
CECL	Current Expected Credit Losses
CET1	Common Equity Tier 1
CFPB	Bureau of Consumer Financial Protection
CFTC	Commodity Futures Trading Commission
CIRT	Credit Insurance Risk Transfer
CLO	Collateralized Loan Obligation
CMBS	Commercial Mortgage-Backed Security
CMO	Collateralized Mortgage Obligation
Co-Co	Contingent Convertible
ComFrame	Common Framework for the Supervision of Internationally Active Insurance Groups
COSSEC	Corporación Pública para la Supervisión y Seguro de Cooperativas
Council	Financial Stability Oversight Council
CP	Commercial Paper
CPMI	Committee on Payments and Market Infrastructures
CRE	Commercial Real Estate
CSBS	Conference of State Bank Supervisors

DCM	Designated Contract Market
DCO	Derivatives Clearing Organization
DFAST	Dodd-Frank Act Stress Tests
DHS	U.S. Department of Homeland Security
Dodd-Frank Act	Dodd-Frank Wall Street Reform and Consumer Protection Act
DoJ	U.S. Department of Justice
DTCC	Depository Trust & Clearing Corporation
DVP	Delivery-versus-Payment
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
ECB	European Central Bank
EME	Emerging Market Economy
ESMA	European Securities and Markets Authority
ETF	Exchange-Traded Fund
ETP	Exchange-Traded Product
EU	European Union
FASB	Financial Accounting Standards Board
FBIC	Financial and Banking Information Infrastructure Committee
FBO	Foreign Banking Organization
FCM	Futures Commission Merchant
FCTF	Financial Crime Task Force

FDIC	Federal Deposit Insurance Corporation
Federal Reserve	Board of Governors of the Federal Reserve System
FFIEC	Federal Financial Institutions Examination Council
FHA	Federal Housing Administration
FHFA	Federal Housing Finance Agency
FHLB	Federal Home Loan Bank
FICC	Fixed Income Clearing Corporation
FICO	Fair Isaac Corporation
FINRA	Financial Industry Regulatory Authority
FIO	Federal Insurance Office
FMI	Financial Market Infrastructure
FMU	Financial Market Utility
FOMC	Federal Open Market Committee
FRBNY	Federal Reserve Bank of New York
FSB	Financial Stability Board
FSOC	Financial Stability Oversight Council
G-20	Group of Twenty
G-SIB	Global Systemically Important Bank
G-SII	Global Systemically Important Insurer
GAV	Gross Asset Value

GCF	General Collateral Finance
GDP	Gross Domestic Product
GECC	General Electric Capital Corporation, Inc.
GO	General Obligation
GSE	Government-Sponsored Enterprise
HELOC	Home Equity Line of Credit
HLA	Higher Loss Absorbency
HMDA	Home Mortgage Disclosure Act
HQLA	High-Quality Liquid Asset
HUD	U.S. Department of Housing and Urban Development
HY	High-Yield
IAIG	Internationally Active Insurance Group
IAIS	International Association of Insurance Supervisors
IASB	International Accounting Standards Board
ICE	Intercontinental Exchange
ICI	Investment Company Institute
ICS	Insurance Capital Standard
IFRS	International Financial Reporting Standards
IG	Investment Grade
IHC	Intermediate Holding Company



IMF	International Monetary Fund
IOSCO	International Organization of Securities Commissions
IRA	Individual Retirement Account
IRS	Internal Revenue Service
ISDA	International Swaps and Derivatives Association
LBO	Leveraged Buyout
LCR	Liquidity Coverage Ratio
LEI	Legal Entity Identifier
LIBOR	London Interbank Offered Rate
M&A	Mergers and Acquisitions
MBS	Mortgage-Backed Security
MISMO	Mortgage Industry Standards Maintenance Organization
MMF	Money Market Mutual Fund
MOVE	Merrill Lynch Option Volatility Estimate
MSR	Mortgage Servicing Right
MTN	Medium-Term Note
NAIC	National Association of Insurance Commissioners
NAV	Net Asset Value
NBER	National Bureau of Economic Research
NCUA	National Credit Union Administration

NIM	Net Interest Margin
NIST	National Institute of Standards and Technology
NMLS	Nationwide Multi-state Licensing System
NMS	National Market System
NPL	Non-Performing Loan
NSFR	Net Stable Funding Ratio
OCC	Office of the Comptroller of the Currency
OFR	Office of Financial Research
OIS	Overnight Indexed Swap
ON RRP	Overnight Reverse Repurchase Agreement
OPEC	Organization of Petroleum Exporting Countries
ORSA	Own Risk and Solvency Assessment
OTC	Over-the-Counter
P/B	Price-to-Book
P&C	Property and Casualty
P/E	Price-to-Earnings
PBGC	Pension Benefit Guaranty Corporation
PBOC	People's Bank of China
PFMI	Principles for Financial Market Infrastructures
PROMESA	Puerto Rico Oversight, Management, and Economic Stability Act

PTF	Principal Trading Firm
QFC	Qualified Financial Contract
REIT	Real Estate Investment Trust
Repo	Repurchase Agreement
RFI	Request for Information
RMBS	Residential Mortgage-Backed Security
ROA	Return on Assets
ROAA	Return on Average Assets
ROE	Return on Equity
RRC	Regulation and Resolution Committee
RRP	Reverse Repurchase Operation
RWA	Risk-Weighted Asset
S&P	Standard & Poor's
SAP	Statutory Accounting Principles
SBSDR	Security-Based Swap Data Repository
SDR	Swap Data Repository
SEC	Securities and Exchange Commission
SEF	Swap Execution Facility
SIFMA	Securities Industry and Financial Markets Association
SLOOS	Senior Loan Officer Opinion Survey on Bank Lending Practices

SLR	Supplementary Leverage Ratio
SRC	Systemic Risk Committee
SRO	Self-Regulatory Organization
STACR	Structured Agency Credit Risk
STRIPS	Separate Trading of Registered Interest and Principal of Securities
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TCCUSF	Temporary Corporate Credit Union Stabilization Fund
Term RRP	Term Reverse Repurchase Agreement
TIPS	Treasury Inflation-Protected Securities
TLAC	Total Loss Absorbing Capacity
TRACE	Trade Reporting and Compliance Engine
Treasury	U.S. Department of the Treasury
TRIP	Terrorism Risk Insurance Program
TRIPRA	Terrorism Risk Insurance Program Reauthorization Act of 2015
UK	United Kingdom
ULI	Universal Loan Identifier
UPB	Unpaid Principal Balance
USD	U.S. Dollar
VA	U.S. Department of Veterans Affairs
VIX	Chicago Board Options Exchange Volatility Index

WAM Weighted-Average Maturity

WTI West Texas Intermediate

YTD Year-to-Date

# Glossary

<b>Additional Tier 1 Capital</b>	A regulatory capital measure which may include items such as noncumulative perpetual preferred stock and mandatory convertible preferred securities which satisfy the eligibility criteria in the Revised Capital Rule, as well as related surplus and minority interests.
<b>Advanced Approaches Capital Framework</b>	The Advanced Approaches capital framework requires certain banking organizations to use an internal ratings-based approach and other methodologies to calculate risk-based capital requirements for credit risk and advanced measurement approaches to calculate risk-based capital requirements for operational risk. The framework applies to large, internationally active banking organizations—generally those with at least \$250 billion in total consolidated assets or at least \$10 billion in total on-balance sheet foreign exposure—and includes the depository institution subsidiaries of those firms.
<b>Affiliate</b>	In general, a company is an affiliate of another company if 1) either company consolidates the other on financial statements prepared in accordance with U.S. Generally Accepted Accounting Principles, the International Finance Reporting Standards, or other similar standards; 2) both companies are consolidated with a third company on financial statements prepared in accordance with such principles or standards; 3) for a company that is not subject to such principles or standards, consolidation as described above would have occurred if such principles or standards had applied; or 4) a primary regulator determines that either company provides significant support to, or is materially subject to the risks or losses of, the other company.
<b>Asset-Backed Commercial Paper (ABCP)</b>	Short-term debt which has a fixed maturity of up to 270 days and is backed by some financial asset, such as trade receivables, consumer debt receivables, securities, or auto and equipment loans or leases.
<b>Asset-Backed Security (ABS)</b>	A fixed income or other type of security which is collateralized by self-liquidating financial assets that allows the holder of the security to receive payments that depend primarily on cash flows from the assets.
<b>Bilateral Repo</b>	A repo between two institutions in which negotiations are conducted directly between the participants or through a broker, and in which the participants must agree on the specific securities to be used as collateral. The bilateral repo market includes both non-cleared trades and trades cleared through Fixed Income Clearing Corporation's DVP repo service.

Central Counterparty (CCP)	An entity which interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer, thereby ensuring the performance of open contracts.
Clearing Bank	A BHC subsidiary that facilitates payment and settlement of financial transactions, such as check clearing, or facilitates trades between the sellers and buyers of securities or other financial instruments or contracts.
Collateral	Any asset pledged by a borrower to guarantee payment of a debt.
Collateralized Loan Obligation (CLO)	A securitization vehicle backed predominantly by commercial loans.
Commercial Mortgage-Backed Security (CMBS)	A security which is collateralized by a pool of commercial mortgage loans and makes payments derived from the interest and principal payments on the underlying mortgage loans.
Commercial Paper (CP)	Short-term (maturity of up to 270 days), unsecured corporate debt.
Common Equity Tier 1 Capital	A regulatory capital measure which includes capital with the highest loss-absorbing capacity, such as common stock and retained earnings.
Common Equity Tier 1 Capital Ratio	A ratio which divides common equity tier 1 capital by total risk-weighted assets. The ratio applies to all banking organizations subject to the Revised Capital Rule.
Common Securitization Platform	A common RMBS securitization infrastructure between Fannie Mae and Freddie Mac.
Comprehensive Capital Analysis and Review (CCAR)	An annual exercise by the Federal Reserve to ensure that institutions have robust, forward-looking capital planning processes which account for their unique risks and sufficient capital to continue operations throughout times of economic and financial stress.
Consumer Price Index (CPI)	A monthly index containing data on changes in the prices paid by urban consumers for a representative basket of goods and services.
Credit Default Swap (CDS)	A financial contract in which one party agrees to make a payment to the other party in the event of a specified credit event, in exchange for one or more fixed payments.

Defined Benefit Plan	A retirement plan in which the cost to the employer is based on a predetermined formula to calculate the amount of a participant's future benefit. In defined benefit plans, the investment risk is borne by the plan sponsor.
Defined Contribution Plan	A retirement plan in which the cost to the employer is limited to the specified annual contribution. In defined contribution plans, the investment risk is borne by the plan participant.
Dodd-Frank Act Stress Tests (DFAST)	Annual stress tests required by the Dodd-Frank Act for national banks and federal savings associations with total consolidated assets of more than \$10 billion.
Duration	The sensitivity of the prices of bonds and other fixed income securities to changes in the level of interest rates.
Emerging Market Economy	Although there is no single definition, emerging market economies are generally classified according to their state of economic development, liquidity, and market accessibility. This report has grouped economies based on the classifications used by significant data sources such as the IMF and Standard & Poor's, which include, for example, Brazil, China, India, and Russia.
Exchange-Traded Product (ETP)	An investment fund or note whose shares are traded on an exchange. ETPs offer continuous pricing—unlike mutual funds, which offer only end-of-day pricing. ETPs are often designed to track an index or a portfolio of assets.
Federal Funds Rate	The interest rate at which depository institutions lend reserve balances to other depository institutions overnight. The FOMC sets a target range for the level of the overnight federal funds rate. The Federal Reserve Bank of New York then uses open market operations to influence the rate so that it trades within the target range.
FICO Score	A measure of a borrower's creditworthiness based on the borrower's credit data; developed by the Fair Isaac Corporation.
Financial and Banking Information Infrastructure Committee (FBIIIC)	The FBIIIC consists of 18 member organizations from across the financial regulatory community, both federal and state. It was chartered under the President's Working Group on Financial Markets following September 11, 2001 to improve coordination and communication among financial regulators, enhance the resiliency of the financial sector, and promote public-private partnership.
Financial Market Infrastructure (FMI)	A multilateral system among participating financial institutions, including the operator of the system, used for the purposes of recording, clearing, or settling payments, securities, derivatives, or other financial transactions. Under the Dodd-Frank Act, certain FMIs are recognized as FMUs.



Financial Market Utility (FMU)	A Dodd-Frank defined entity, which, subject to certain exclusions, is “any person that manages or operates a multilateral system for the purpose of transferring, clearing, or settling payments, securities, or other financial transactions among financial institutions or between financial institutions and the person.”
Fire Sale	The disorderly liquidation of assets to meet margin requirements or other urgent cash needs. Such a sudden sell-off drives down prices, potentially below their intrinsic value, when the quantities to be sold are large relative to the typical volume of transactions. Fire sales can be self-reinforcing and lead to additional forced selling by some market participants which, subsequent to an initial fire sale and consequent decline in asset prices, may also need to meet margin or other urgent cash needs.
Fiscal Year	Any 12-month accounting period. The fiscal year for the federal government begins on October 1 and ends on September 30 of the following year; it is named after the calendar year in which it ends.
Futures Contract	An agreement to purchase or sell a commodity for delivery in the future: (1) at a price that is determined at initiation of the contract; (2) that obligates each party to the contract to fulfill the contract at the specified price; (3) that is used to assume or shift price risk; and (4) that may be satisfied by delivery or offset.
General Collateral Finance (GCF)	An interdealer repo market in which the Fixed Income Clearing Corporation plays the role of intraday CCP. Trades are netted at the end of each day and settled at the tri-party clearing banks. See <i>Tri-party Repo</i> .
Government-Sponsored Enterprise (GSE)	A corporate entity with a federal charter authorized by law, but which is a privately owned financial institution. Examples include the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac).
Gross Domestic Product (GDP)	The broadest measure of aggregate economic activity, measuring the total value of all final goods and services produced within a country’s borders during a specific period.
Gross Notional Exposure	The sum of the absolute values of long and short notional amounts. The “notional” amount of a derivative contract is the amount used to calculate payments due on that contract, just as the face amount of a bond is used to calculate coupon payments.
Haircut	The discount, represented as a percentage of par or market value, at which an asset can be pledged as collateral. For example, a \$1,000,000 bond with a 5 percent haircut would collateralize a \$950,000 loan. The purpose of a haircut is to provide a collateral margin for a secured lender.

Held-to-Maturity	An accounting term for debt securities accounted for at amortized cost, under the proviso that the company can assert that it has the positive intent and ability to hold the securities to maturity.
High-Quality Liquid Asset (HQLA)	An asset—such as a government bond—which is considered eligible as a liquidity buffer in the U.S. banking agencies' liquidity coverage ratio. High-quality liquid assets should be liquid in markets during times of stress and, ideally, be central bank-eligible.
Home Equity Line of Credit (HELOC)	A line of credit extended to a homeowner which uses the home as collateral.
Household Debt Service Ratio	An estimate of the ratio of debt payments to disposable personal income. Debt payments consist of the estimated required payments on outstanding mortgage and consumer debt.
Household Formation	A measure of housing demand, calculated as the month-to-month change in the number of occupied housing units.
Interest Rate Risk Management	The management of the exposure of an individual's or an institution's financial condition to movements in interest rates.
Interest Rate Swap	A derivative contract in which two parties swap interest rate cash flows on a periodic basis, referencing a specified notional amount for a fixed term. Typically one party will pay a predetermined fixed rate while the other party will pay a short-term variable reference rate which resets at specified intervals.
Large-Scale Asset Purchases	Purchases by the Federal Reserve of securities issued by the U.S. government or securities issued or guaranteed by government-sponsored agencies (including Fannie Mae, Freddie Mac, Ginnie Mae, and the Federal Home Loan Banks) in the implementation of monetary policy.
Legal Entity Identifier (LEI)	A 20-digit alpha-numeric code that connects to key reference information which enables clear and unique identification of companies participating in global financial markets. The LEI system is designed to facilitate many financial stability objectives, including: improved risk management in firms; better assessment of microprudential and macroprudential risks; expedition of orderly resolution; containment of market abuse and financial fraud; and provision of higher-quality and more accurate financial data.
Leveraged Buyout	An acquisition of a company financed by a private equity contribution combined with borrowed funds, with debt comprising a significant portion of the purchase price.

Leveraged Loan	A loan for which the obligor's post-financing leverage as measured by debt-to-assets, debt-to-equity, cash flow-to-total debt, or other such standards unique to particular industries significantly exceeds industry norms. Leveraged borrowers typically have a diminished ability to adjust to unexpected events and changes in business conditions because of their higher ratio of total liabilities to capital.
Liquidity Coverage Ratio (LCR)	A standard to ensure that covered companies maintain adequate unencumbered, high-quality liquid assets to meet anticipated liquidity needs for a 30-day horizon under a standardized liquidity stress scenario.
Loan-to-Value Ratio	The ratio of the amount of a loan to the value of the asset that the loan funds, typically expressed as a percentage. This is a key metric when considering the level of collateralization of a mortgage.
London Interbank Offered Rate (LIBOR)	The interest rate at which banks can borrow unsecured funds from other banks in London wholesale money markets, as measured by daily surveys. The published rate is a trimmed average of the rates obtained in the survey.
Major Swap Participant	A person that is not a swap dealer and maintains a substantial position in swaps, creates substantial counterparty exposure, or is a financial entity that is highly leveraged and not subject to federal banking capital rules.
Money Market Mutual Fund (MMF)	A type of mutual fund which invests in short-term, liquid securities such as government bills, CDs, CP, or repos.
Mortgage-Backed Security (MBS)	ABS backed by a pool of mortgages. Investors in the security receive payments derived from the interest and principal payments on the underlying mortgages.
Mortgage Servicing Company	A company which acts as an agent for mortgage holders by collecting and distributing mortgage cash flows. Mortgage servicers also manage defaults, modifications, settlements, foreclosure proceedings, and various notifications to borrowers and investors.
Municipal Bond	A bond issued by states, cities, counties, local governmental agencies, or certain nongovernment issuers to finance certain general or project-related activities.
Net Asset Value (NAV)	An investment company's total assets minus its total liabilities.
Net Interest Margin (NIM)	Net interest income as a percent of interest-earning assets.

Net Stable Funding Ratio (NSFR)	A liquidity standard to promote the funding stability of internationally active banks, through the maintenance of stable funding resources relative to assets and off-balance sheet exposures.
Open Market Operations	The purchase and sale of securities in the open market by a central bank to implement monetary policy.
Option	A financial contract granting the holder the right but not the obligation to engage in a future transaction on an underlying security or real asset. The most basic examples are an equity call option, which provides the right but not the obligation to buy a block of shares at a fixed price for a fixed period, and an equity put option, which similarly grants the right to sell a block of shares.
Over-the-Counter (OTC)	A method of trading which does not involve an organized exchange. In OTC markets, participants trade directly on a bilateral basis, typically through voice or computer communication and often with certain standardized documentation with counterparty-dependent terms.
Part 30 Accounts	Accounts which are for U.S. customers who trade futures and options on exchanges outside the U.S.
Primary Dealer	A financial institution that is a trading counterparty of the Federal Reserve Bank of New York. Primary dealers are expected to make markets for the Federal Reserve Bank of New York on behalf of its official accountholders as needed, and to bid on a pro-rata basis in all Treasury auctions at reasonably competitive prices.
Prudential Regulation	Regulation aimed at ensuring the safe and sound operation of financial institutions, set by both state and federal authorities.
Public Debt	All debt issued by Treasury and the Federal Financing Bank, including both debt held by the public and debt held in intergovernmental accounts, such as the Social Security Trust Funds. Not included is debt issued by government agencies other than the Department of the Treasury.
Qualifying Hedge Fund	A hedge fund advised by a Large Hedge Fund Adviser that has a net asset value (individually or in combination with any feeder funds, parallel funds, and/or dependent parallel managed accounts) of at least \$500 million as of the last day of any month in the fiscal quarter immediately preceding the adviser's most recently completed fiscal quarter. Large Hedge Fund Advisers are advisers that have at least \$1.5 billion in hedge fund assets under management.

Real Estate Investment Trust (REIT)	An operating company which manages income-producing real estate or real estate-related assets. Certain REITs also operate real estate properties in which they invest. To qualify as a REIT, a company must have three-fourths of its assets and gross income connected to real estate investment and must distribute at least 90 percent of its taxable income to shareholders annually in the form of dividends.
Repurchase Agreement (Repo)	The sale of a security combined with an agreement to repurchase the security, or a similar security, on a specified future date at a prearranged price. A repo is a secured lending arrangement.
Residential Mortgage-Backed Security (RMBS)	A security which is collateralized by a pool of residential mortgage loans and makes payments derived from the interest and principal payments on the underlying mortgage loans.
Revised Capital Rule	The capital rule which revised the risk-based and leverage capital requirements for U.S. banking organizations, as finalized by the Federal Reserve Board and the OCC in October 2013 (78 FR 62018), and for which the FDIC issued a substantially identical interim rule in September 2013 (78 FR 55340). In April 2014, the FDIC adopted the interim final rule as a final rule with no substantive changes (79 FR 20754).
Risk-Based Capital	An amount of capital, based on the risk-weighting of various asset categories, which a financial institution holds to help protect against losses.
Risk-Weighted Assets (RWAs)	A risk-based concept used as the denominator of risk-based capital ratios (common equity tier 1, tier 1, and total). The total RWAs for an institution are a weighted total asset value calculated from assigned risk categories or modeled analysis. Broadly, total RWAs are determined by calculating RWAs for market risk and operational risk, as applicable, and adding the sum of RWAs for on-balance sheet, off-balance sheet, counterparty, and other credit risks.
Rollover Risk	The risk that as an institution's debt nears maturity, the institution may not be able to refinance the existing debt or may have to refinance at less favorable terms.
Run Risk	The risk that investors lose confidence in an institution—due to concerns about counterparties, collateral, solvency, or related issues—and respond by pulling back their funding.
Securities Lending/Borrowing	The temporary transfer of securities from one party to another for a specified fee and term, in exchange for collateral in the form of cash or securities.

Securitization	A financial transaction in which assets such as mortgage loans are pooled, securities representing interests in the pool are issued, and proceeds from the underlying pooled assets are used to service and repay the securities.
Security-Based Swap Dealer	A person that holds itself out as a dealer in security-based swaps, makes a market in security-based swaps, regularly enters into security-based swaps with counterparties, or engages in any activity causing it to be known as a dealer or market maker in security-based swaps; does not include a person entering into security-based swaps for such person's own account.
Separately Managed Accounts	Portfolios of assets or securities which are directly owned by investors and managed by professional investment firms.
Short-Term Wholesale Funding	Short-term funding instruments not covered by deposit insurance which are typically issued to institutional investors. Examples include large checkable and time deposits, brokered CDs, CP, Federal Home Loan Bank borrowings, and repos.
Supplementary Leverage Ratio (SLR)	Tier 1 capital of an advanced approaches banking organization divided by total leverage exposure. All advanced approaches banking organizations must maintain an SLR of at least 3 percent. The SLR is effective January 1, 2018, and organizations must calculate and publicly disclose their SLRs beginning March 31, 2015.
Swap	An exchange of cash flows with defined terms and over a fixed period, agreed upon by two parties. A swap contract may reference underlying financial products across various asset classes including interest rates, credit, equities, commodities, and FX.
Swap Data Repository (SDR)	A person that collects and maintains information or records with respect to transactions or positions in, or the terms and conditions of, swaps entered into by third parties for the purpose of providing a centralized recordkeeping facility for swaps. In certain jurisdictions, SDRs are referred to as trade repositories. The Committee on Payments and Settlement Systems and IOSCO describe a trade repository as "an entity that maintains a centralized electronic record (database) of transaction data."
Swap Dealer	A person that holds itself out as a dealer in swaps, makes a market in swaps, regularly enters into swaps with counterparties, or engages in any activity causing it to be known as a dealer or market maker in swaps; does not include a person entering into swaps for such person's own account.
Swap Execution Facility (SEF)	A term defined in the Dodd-Frank Act as a trading platform which market participants use to execute and trade swaps by accepting bids and offers made by other participants.

Swap Future	A futures contract which mimics the economic substance of a swap.
Swaption	An option granting the right to enter into a swap. See <i>Option</i> and <i>Swap</i> .
Tier 1 Capital	A regulatory capital measure comprised of common equity tier 1 capital and additional tier 1 capital. See <i>Common Equity Tier 1 Capital</i> and <i>Additional Tier 1 Capital</i> .
Tier 2 Capital	A regulatory capital measure which includes subordinated debt with a minimum maturity of five years and satisfies the eligibility criteria in the Revised Capital Rule.
Time Deposits	Deposits which the depositor generally does not have the right to withdraw before a designated maturity date without paying an early withdrawal penalty. A CD is a time deposit.
Total Capital	A regulatory capital measure comprised of tier 1 capital and tier 2 capital. See <i>Tier 1 Capital</i> and <i>Tier 2 Capital</i> .
Tri-Party Repo	A repo in which a clearing bank acts as third-party agent to provide collateral management services and to facilitate the exchange of cash against collateral between the two counterparties.
Underwriting Standards	Terms, conditions, and criteria used to determine the extension of credit in the form of a loan or bond.
VIX (Chicago Board Options Exchange Market Volatility Index)	A standard measure of market expectations of short-term volatility based on S&P equity index option prices.
Weighted-Average Maturity (WAM)	A weighted average of the time to maturity on all loans in an asset-backed security.
Yield Curve	A graphical representation of the relationship between bond yields and their respective maturities.

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